

**State of Vermont  
Agency of Natural Resources  
Department of Forests, Parks and Recreation  
Fish & Wildlife Department**

## ***Ascutney Management Unit***

### **Natural Resource Assessment and Analysis**

Including lands of:

Little Ascutney Wildlife Management Area  
Mt. Ascutney State Park  
Skitchewaung Wildlife Management Area  
Weathersfield Wildlife Management Area  
Wilgus State Park



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## Ascutney Management Unit Acreages

1/20/12

<b>Parcel</b>	<b>Town</b>	<b>Fee</b>	<b>Non Fee*</b>	<b>Total</b>
<b>Little Ascutney WMA</b>				<b>860.50</b>
	Weathersfield	639.5	209	848.50
	West Windsor	12		12.00
<b>Mt. Ascutney State Park</b>				<b>3,132.00</b>
	Windsor	2639	0	2,639.00
	Weathersfield	493	0	493.00
<b>Skitchewaug WMA</b>				<b>235.27</b>
Mountain Block (1)	Springfield	175	41.27	216.27
Spencer Brook Block (2)	Springfield	19	0	19.00
<b>Weathersfield WMA*</b>				<b>79.80</b>
	Weathersfield	0	79.8	
<b>Wilgus State Park</b>				<b>89.10</b>
	Weathersfield	89.1	0	89.10
				<b>4,396.67</b>

\* Timber reserved

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## **I. Ecological Assessment and Natural Community Description and Maps**

### **Ecological Assessment of the Ascutney Management Unit**

The Agency of Natural Resources uses the “coarse filter/ fine filter” approach to the ecological inventory and assessment of state lands (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000). Widely employed as a management tool on state, federal, and private lands (see for example: Leslie et al. 1996; Stein et al. 2000; USFS 2000; USFS 2004), it is an aid to land managers who seek to protect most or all of the species that naturally occur on their lands, but who lack the resources to make exhaustive inventories of all taxonomic groups. Because many groups of organisms are cryptic or poorly understood (for example, fungi and soil invertebrates), it is not practical to make lists of all of them (Anderson et al. 1999; Willis and Whittaker 2002). Even if we could assemble such lists of species, it would be impossible to manage the land with all of them in mind. Instead, natural communities are treated as a proxy for the biological organisms of which they are composed. It is thought that if examples of all of Vermont’s natural communities are conserved at the scale at which they naturally occur, most of the species they contain, from the largest trees and mammals to the smallest insects, will also be conserved (NCASI 2004). Natural communities are thus a coarse filter for “catching” the majority of an area’s native organisms. Because conservation of habitats (in the form of natural communities) will not protect all species, we also employ a “fine filter” to catch the remaining species that are known to require very specific conditions for their growth, reproduction, wintering, etc. Examples of organisms benefiting from the fine filter inventories described below include breeding birds, deer on their wintering areas, and rare plants.

Interior units of this LUC are considered core forest as well as important wildlife travel corridor.

The coarse filter assessment begins by describing landscape and climatic factors that characterize the Ascutney Management Unit (AMU), such as bedrock geology and water resources. It then details the 33 distinct natural community types documented and mapped during inventories of the AMU. This is followed by a fine filter assessment describing rare species, invasive plants, and wildlife habitats found here.

### **Coarse Filter Assessment**

#### **Biophysical Region and Climate**

Vermont’s biological landscapes are divided into eight regions that share features of climate, topography, geology, human history, and natural communities. These regions are continuous in adjacent states, and are related to regional and national classifications of ecological systems in North America. The AMU is located in the Southern Vermont Piedmont biophysical region. This region includes much of Vermont’s Connecticut River valley as well as associated foothills to the west. This mostly forested region features productive soils and a relatively mild climate; it was thus historically an important agricultural area of the state, and many farms are still found there. The Connecticut and several large rivers run through the region. Bedrock is variable, but in many areas, contributes to mineral-rich soils. The valleys in the region feature many soils derived from deep accumulations of glacial outwash and glacial lake deposits; glacial till soils

predominate on the hills and mountains. The Southern Piedmont region receives less rainfall than much of the rest of Vermont, and in some areas, particularly well drained south facing slopes, growing conditions can be very dry.

### Bedrock and Surficial Geology and Soils

The geologic history of this area has much to do with the current distribution of natural communities in the AMU. The bedrock geology of this region of Vermont is complex, but can be broadly divided into the older metamorphosed sedimentary rocks, and the younger igneous intrusions (or plutons) that have resisted erosion and are responsible for the heights of Mount Ascutney and Little Ascutney Mountain (Doll et al. 1961). For much of the AMU, broad bands of metamorphosed Cambrian-era dolostone, and Silurian- and Devonian-era quartzite, phyllite, slate, and limestone run roughly north to south. Of these, dolostone and limestone are particularly mineral-rich rocks that contribute to soil enrichment, and these are found at Skitchewaug WMA and at the southern edge of Little Ascutney WMA. The other metamorphic rocks are not consistently mineral rich, but can sometimes contribute to soil enrichment. Evidence of this moderate enrichment was noted throughout the AMU. The igneous rocks of Mount Ascutney and Little Ascutney Mountain are more recently formed Permian/Triassic-era granite, syenite, diorite, and gabbro (all of which are generally similar to granite). These rocks weather slowly, are acidic, and do not contribute significantly to soil enrichment.

The degree to which these bedrock members affect growing conditions at the AMU is mediated by the depth of the surficial materials deposited at the end of the last glaciation, some 15,000-12,000 years ago. As the glacier ice melted, rock fragments of all sizes, from boulders to clay, fell in an unsorted jumble known as glacial till, and most mountainous areas of the AMU feature a layer of this over the bedrock (Doll et al. 1970). Glacial till depths are usually less than about 40", but they may be deeper. Because of the steep terrain, cliffs and rock outcrops are common in the AMU, and these areas are either too steep to have ever held till, or have been scoured bare by erosion. Here bedrock has a very immediate impact on the plant communities, and as a result the calcium-rich cliffs of Skitchewaug WMA host very different species than the acidic igneous cliffs of Little Ascutney. The flatter areas closer to the Connecticut River were inundated by glacial Lake Hitchcock, which filled the river valley as the ice melted. Fast moving waters of the lake and associated river waters deposited deep piles of generally well-sorted sands, silts and gravels. These materials are usually very well drained, and set the stage for such drought-adapted natural communities as the white pine-red oak-black oak forests found along the eastern edge of the AMU. More recent deposits of muck and peat are found in many of the wetlands. These are organic materials deposited in very acidic and anaerobic environments, and consequently they decay more slowly than they are produced.

The soils of the AMU are primarily products of these surficial deposits, though they may also be influenced by bedrock weathering. Glacial till-derived soils are the most widely distributed; these are generally rocky silt loams such as the Cabot, Dummerston, Hogback-Rawsonville, Tunbridge-Lyman, Vershire-Dummerston soil series. In most areas of the AMU these are only moderately productive soils. Soils formed on the glacial lake- and river-deposited sediments are found only at Hoyt's Landing Access Area, on the eastern edge of Mt. Ascutney State Park, and at Wilgus State Park. These include Hinkley and Windsor loamy fine sands, Ninigret and Eldridge fine sandy loams, and Limerick silt loam. These soils are greater than 5' in depth. Most

of the wetlands in the AMU are too small for the soils to have been mapped by the NRCS. One hemlock swamp in Skitchewaugh WMA is mapped as Pondicherry and Wonsqueak mucks. Most wetlands had peaty and/or mucky soils of varying depths, and are noted in the individual community descriptions.

### Hydrology/Streams/Rivers/Ponds

The AMU receives between 36 and 42” of precipitation annually, a relatively small amount compared to the rest of the state. The WMA is entirely within the Connecticut River watershed, but stretches across smaller watersheds that drain to that river. Hoyt’s Landing AA, Skitchewaugh WMA, Weathersfield WMA and Wilgus State Park all are immediately adjacent to the Connecticut River and have only small stream draining the parcels. Mt. Ascutney State Park sits on the divide between two sub-watersheds, though confusingly both the main stems of these streams are known as Mill Brook. The boundary is the southern-most ridge that the Futures trail roughly follows. All of Little Ascutney WMA drains into the North Branch of Black Brook. Although there are vernal pools and seasonal standing water in wetland communities, no permanent water bodies occur within the AMU. While the flow of water plays a critical role in the structuring of natural communities and habitats associated with swamps and seeps in the AMU, it is the lack of water that characterizes much of the acreage. Many of the natural communities described below feature plants that are adapted to droughty conditions.

### Natural Communities

A natural community is an assemblage of biological organisms, their physical environment (e.g., geology, hydrology, climate, natural disturbance regime, etc.), and the interactions between them (Thompson and Sorenson 2000). More than a simple collection of species, a natural community is characterized by complex webs of mutualism, predation, and other forms of interaction. The 80 natural community types described in Vermont repeat across the landscape in patches (or “polygons”) of various sizes. These patches (or groups of patches in close proximity to each other) are referred to as natural community *occurrences*, and are to be distinguished from broad descriptions of community types. Natural community occurrences vary greatly in their size. *Matrix* communities, such as hemlock forests, occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. *Large patch* communities, such as red oak-northern hardwood forest, typically occur at scales of 10-100 acres. *Small patch* communities such as rock outcrops and vernal pools are usually less than 10 acres in size, and owe their existence to highly localized site and disturbance characteristics.

Natural communities in the AMU were identified through aerial photograph interpretation and field surveys. Field data were collected using a Trimble GeoXM global positioning system (G.P.S.) unit, clinometer, compass, binoculars, soil augur, Cornell pH kit, and a variety of reference manuals for identification of plants, animals, fungi, etc. Many plant specimens were collected for identification in the lab. A Geographic Information System (G.I.S.) map of natural communities was produced using ArcView software from ESRI, Inc. Because some natural communities occur at very small scales (e.g., less than ¼ acre), this mapping effort is probably incomplete. Natural community mapping is an iterative process, and our knowledge improves with each mapping effort. Thus, the map presented here should not be viewed as a final statement on community distribution in the AMU; instead, it should be treated as a first attempt

at describing natural communities in this area. Land managers and members of the public should be aware that additional examples of small patch natural communities (e.g., vernal pools and seeps) probably occur on the management unit. As subsequent inventories and site visits are conducted, this map will be improved.

Natural community occurrences are assigned a quality rank, a statement of their overall ecological value which helps guide management. An “A”-ranked occurrence is of high quality relative to others of its type in the state, while a D-ranked example is of comparatively low quality. Quality ranks are objectively assigned on the basis of three factors: occurrence size, current condition, and landscape context. The three factors vary in the degree to which they influence overall quality in different communities. For example, size and landscape quality are more important factors than current condition in the quality ranking of northern hardwood forests, while current condition and landscape context receive greater attention in the ranking of rich northern hardwood forests. It is important to recognize that assignment of low quality ranks may be due to small size rather than poor current condition. When community occurrences are either rare or of high quality (or a combination of these factors), they may be designated as being of “statewide significance.” This designation is applied according to objective guidelines established by the Vermont Nongame and Natural Heritage Program, which are available upon request. It is recommended that state-significant natural communities be afforded a higher level of protection than other areas of the management unit.

Seventy-two occurrences of 33 natural community types (and 2 variants) were identified and mapped in the AMU (see Tables 1 and 2). A total of 138 natural community polygons were mapped. Some broad patterns emerged from this mapping effort. Forested natural communities follow an elevational gradient, with low-elevation forests having a strong component of eastern hemlock (*Tsuga canadensis*), while mixed hardwoods dominate at mid-elevations. Slope aspect also plays a role, with southern and western facing slopes having a higher proportion of oaks and hickories. Shady north facing slopes and sharp stream valleys had more northern hardwood forest and hemlock forest. Montane forests with red spruce (*Picea rubens*), balsam fir (*Abies balsamea*) and birches cover the highest elevations of Mount Ascutney.

The topography, soils, vegetation, and wildlife associations of each natural community in the AMU are described in Tables 1 and 2. Table 1 summarizes Wetland Natural Communities, their location, acreage, state distribution, and rank. Table 2 summarizes this information for Upland Natural Communities.

**Key to Units in the Tables:**

LA = Little Ascutney WMA

MA = Mt. Ascutney State Park

SK = Skitchewaug WMA

SK2 = Skitchewaug WMA Block 2, Hoyts Landing AA wetland

WE = Weathersfield WMA

WG = Wilgus State Park

 = state significant example of an uncommon or rare natural community

Unit(s)	Natural Community	Acres	Vermont Distribution	State Significant Example?
SK2	Alluvial Shrub Swamp	3	common	
LA	Beaver Wetland	7	common	
SK2	Cattail Marsh	4	common	
SK	Hemlock-Balsam Fir-Black Ash Seepage Swamp	7	uncommon	Yes
SK	Hemlock-Sphagnum Acidic Basin Swamp	1	rare	Yes
WE	Red Maple-Black Ash Seepage Swamp	3	common	
SK	Red Maple-Black Gum Swamp	0.5	rare	Yes
WG	Rivershore Grassland	5	uncommon	
LA	Seep	1.7	common	
SK, SK2	Shallow Emergent Marsh	5	common	
MA	Spruce-Fir-Tamarack Swamp	<0.1	uncommon	
SK, WG	Vernal Pool	0.6	common	Unknown*

For more information on these and other natural communities, see *Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont*, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: [http://www.vtfishandwildlife.com/books.cfm?libbase\\_=Wetland,Woodland,Wildland](http://www.vtfishandwildlife.com/books.cfm?libbase_=Wetland,Woodland,Wildland)

*\*Vernal pools must be evaluated during amphibian breed season (spring) to determine if a pool is considered state-significant.*

**Table 2: Upland Natural Communities of the Ascutney Management Unit**

Unit(s)	Natural Community	Acres	Vermont Distribution	State Significant Example?
MA	Boreal Outcrop	1	common	
MA	Boreal Talus Woodland	3	uncommon	Yes
MA, LA	Dry Oak-Hickory-Hophornbeam Forest	155	uncommon	Yes
MA, SK	Dry Oak Forest	67	uncommon	Yes
MA	Dry Oak Woodland	3.5	rare	Yes
MA, LA, SK, WE	Hemlock Forest	885	common	Yes
MA, LA, WG, WE	Hemlock-Northern Hardwood Forest	950	common	
MA, LA, SK, WE	Mesic Maple-Ash-Hickory-Oak Forest	344	uncommon	Yes
LA, MA, WG	Mesic Red Oak-Northern Hardwood Forest	623	common	Yes
MA	Montane Spruce-Fir Forest <sup>[1]</sup>	105	uncommon	Yes
MA	Montane Yellow Birch-Red Spruce Forest	420	uncommon	Yes
MA, LA	Northern Hardwood Forest	738	very common	
MA	Northern Hardwood Talus Woodland	3	uncommon	Yes
MA	Red Spruce-Red Oak Forest	89	uncertain	Unknown**
MA, WE	Rich Northern Hardwood Forest	24	common	
SK2	Sandy Slope Seepage Forest	1	unknown	
LA	Temperate Acidic Cliff <sup>[2]</sup>	2.5	common	Yes
MA, LA	Temperate Acidic Outcrop	10	common	Yes
SK	Temperate Calcareous Cliff	7	uncommon	Yes
LA, SK	Transition Hardwood Talus Woodland	27	uncommon	Yes
MA, WG, SK2	White Pine-Red Oak-Black Oak Forest	143	rare	Yes

For more information on these and other natural communities, see *Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont*, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: [http://www.vtfishandwildlife.com/books.cfm?libbase =Wetland,Woodland,Wildland](http://www.vtfishandwildlife.com/books.cfm?libbase=Wetland,Woodland,Wildland)

*\*\*This is a new community type described provisionally in this report. As such, there are no specifications to determine if it meets criteria for state-significance.*

<sup>[1]</sup> Historic records of Bicknell's Thrush, no recent record.

<sup>[2]</sup> Historic records of timber rattlesnake and peregrine falcon, no recent record except peregrine falcon at Skitchewaug WMA.

## **Natural Communities of the Ascutney Management Unit**

### **Alluvial Shrub Swamp – S4**

A three-acre alluvial shrub swamp is found at the wetland parcel of Hoyt's Land Access Area in Springfield, along a small stream that feeds into the Connecticut River. The soils are mapped as frequently flooded Limerick Silt Loams, which are deep (>60") soils. Field sampling showed that the soil was at least 48" of undifferentiated silt, with occasional lenses of very fine sand—a pattern suggesting that recent alluvial deposits overlay the Limerick Silt Loam. The water table was below the level sampled, but mottling was visible starting at 42" below the surface. It is expected that over time the stream channel will migrate across the floodplain, and this disturbance plays a role in maintaining this shrub-dominated community.

Only a few scattered 40-50' tall box elder (*Acer negundo*) and black ash (*Fraxinus nigra*) grow close to the stream. At the edges of the floodplain, 60' tall white pines (*Pinus strobus*) are present, grading into a hemlock forest that was outside the state-owned land. The tall shrub speckled alder (*Alnus incana*) is the dominant vegetation. It occurs in dense patches reaching 10-15' in height, averaging 60% cover. Herbs are abundant (near 100% cover), especially so in areas with little shrub cover. Some frequent species include ostrich fern (*Matteuccia struthiopteris*), sensitive fern (*Onoclea sensibilis*), hog peanut (*Amphicarpaea bracteata*), a non-native burdock (*Arctium* sp.), stinging nettle (*Urtica dioica*), tear-thumb (*Polygonum sagittatum*), tall meadow-rue (*Thalictrum pubescens*), joe-pye weed (*Eupatorium maculatum*) and jewelweed (*Impatiens capensis*). The vine Virginia creeper (*Parthenocissus quinquefolia*) is also common. The non-native and potentially invasive reed canary grass (*Phalaris arundinacea*) is present, though not abundant. Mosses are absent in this community.

This one occurrence is C-ranked. It is surrounded by several busy roads including I-91, and probably has a long history of human disturbance. Nevertheless, though small and hemmed in, this community might provide a protected travel corridor for wildlife like mink or red fox. Larger mammals seem to use this area too—there is a well-used game trail running through the alders, with clear moose tracks.

### **Beaver Wetland – not ranked**

Although they are common across Vermont's landscape, only two beaver wetlands were identified in the AMU. Both are in Little Ascutney WMA and together they cover seven acres. Beaver wetlands change due to the influence (or lack of influence) from beavers at any given time. As a result, despite being similar to shallow emergent marsh and alder swamp communities (see Thompson and Sorenson 2000), these areas are mapped as beaver wetlands to indicate their dynamic nature.

Located on an intermittent headwater stream of the North Branch of Black Brook, these wetlands contain small areas of standing water amid the vegetated marsh. Soils are a saturated muck, presumably on top of the NRCS-mapped Buckland Loam. Tree canopy cover is largely absent, though many drowned snags of white pine (*Pinus strobus*), and northern hardwood species are

present. Speckled alder (*Alnus incana*), wild apple (*Pyrus malus*), and willows (*Salix* spp.) are present in the tall shrub layer (total cover 10-40%). Low shrub cover (30%) includes meadowsweet (*Spiraea alba*). Herb cover is near 100% and some frequent species include sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), crested woodfern (*Dryopteris cristata*), joe-pye weed (*Eupatorium maculatum*), several goldenrod species (*Solidago* spp.), fringed sedge (*Carex crinita*), black raspberry (*Rubus occidentalis*) and common hop sedge (*Carex lupulina*). Two non-native species are present in these wetlands: an exotic honeysuckle (*Lonicera* sp.) and reed canary grass (*Phalaris arundinacea*).

Beaver wetlands can be an important open habitat amid otherwise forested landscape, hosting a variety of bird and mammal species. Although these wetlands are small, they may create a niche for animals that might not otherwise use Little Ascutney WMA. In particular, bat field surveys indicated that the beaver wetland complex had the highest level of bat activity in the AMU; little brown bat was the most common species noted in the beaver wetland (Kilpatrick 2009).

### **Boreal Outcrop – S4**

Four boreal outcrops, grouped into three occurrences, have been mapped in the AMU, totaling just less than one acre. All are in Mt. Ascutney State Park and three are heavily disturbed, and have a quality rank of C and D. (The fourth example is largely undisturbed but is small in size.) The summit of Mount Ascutney is a large exposure of bare rock around the communications tower, and this outcrop may be of human origin. (If it is of human origin, it is not technically a “natural” community, but it seems unlikely this site will be anything other than a rock outcrop for a long time.) The other outcrops, which appear to be naturally occurring, have been heavily disturbed by the hang gliders that use them as launching areas. Both are almost entirely bare of vegetation due to trampling. A smattering of red spruce (*Picea rubens*), hay-scented fern (*Dennstaedtia punctilobula*), and bristly sarsaparilla (*Aralia hispida*) are present at one outcrop. Although these two herb species are not characteristic of boreal outcrops, based on the elevation (over 3000’ for two, and over 2600 for the third) and the surrounding montane spruce-fir forest community, it seems probable that in the absence of disturbance these sites would host more characteristic boreal species, which might include velvetleaf blueberry (*Vaccinium myrtilloides*), poverty grass (*Danthonia spicata*), and hairgrass (*Deschampsia flexuosa*), along with haircap mosses (*Polytrichum* spp.) and various lichens.

It is likely that in addition to the mapped polygons, there are other small Boreal Outcrops within the larger matrix of montane spruce-fir forest and montane yellow birch-red spruce forest.

### **Boreal Talus Woodland – S3**

Located on an eastern ridge of Ascutney Mountain, the single occurrence of this community within the AMU is made up of two patches. This 3-acre occurrence is considered state-significant.

The lower elevation patch is an unusual example of this community type: The rocks are about 50% non-vegetated, and are a coarse pinkish igneous rock. An emergent canopy of red spruce (*Picea rubens*) 40-60' tall and 10-12" dbh is scattered (10% cover) above a 40-70% canopy of 35-40' tall (and 4-6" dbh) red spruce, paper birch (*Betula papyrifera*), and, oddly, red oak (*Quercus rubra*), and white pine (*Pinus strobus*). Shrubs include paper birch, early low blueberry (*Vaccinium angustifolium*), red spruce, red oak, and striped maple (*Acer pensylvanicum*). Herbs noted were: common polypody (*Polypody virginianum*), bracken fern (*Pteridium aquilinum*), and wintergreen (*Gaultheria procumbens*).

Higher on the same ridge is a more familiar Boreal Talus Woodland, on large blocks of granite with scattered red spruce, blueberries (*Vaccinium* spp.), and lichens. This talus appears to have been stable for some time, and lacks the smaller rocks found in the lower example.

Boreal talus woodland is suitable for two rare mammal species, long-tailed shrew and rock vole, but neither species was found during small mammal surveys of the AMU (Kilpatrick 2009).

#### **Cattail Marsh – S4**

A single four-acre occurrence of this community is found at the at the wetland parcel of Hoyt's Land Access Area parcel in Springfield. This polygon was not visited during field inventories, but was observed with binoculars from the adjacent road. It appears to be closely related to the adjacent shallow emergent marsh, but clearly dominated by cattail (*Typha latifolia*). In general, cattail marshes have low plant diversity, though they frequently serve ecologically important functions. A typical cattail marsh is inundated with shallow water for much or all of the growing season. Soils are saturated but well-decomposed mucks or muck-mineral soils. Cattails (*Typha* spp.) are the dominant vegetation; other abundant plants can include giant bur-reed (*Sparganium eurycarpum*), water parsnip (*Sium suave*), and pickerelweed (*Pontederia cordata*). Cattail marshes are used by a variety of rare and uncommon bird species including least bitterns, common moorhens, and soras. This proximity of this particular marsh to the Connecticut River and other wetlands may make it more heavily used by wildlife than might be expected from its small size. This occurrence is D-ranked because of its small size and landscape context.

#### **Dry Oak-Hickory-Hophornbeam Forest – S3**

This forest occurs on low ridgetops and on south or west-facing slopes, where sunny exposure and rocky, well-drained, shallow-to-bedrock soils combine to produce a dry environment that favors oaks and hickories. Ten patches of this community were identified in the AMU, ranging from just one acre to over 50 acres in area. These are grouped into three occurrences, with the largest A-ranked and covering 117 acres in Little Ascutney WMA. All occurrences of this community in the AMU are considered state-significant examples.

Examples of this community vary somewhat from the description presented in Thompson and Sorenson (2000), and the overall species mix suggests a slightly more fertile environment than the typical dry oak-hickory-hophornbeam forest. Despite the name, hickories (*Carya* spp.) are

only a small component of these forests in the AMU. Red oak (*Quercus rubra*) and sugar maple (*Acer saccharum*) are generally co-dominant in the emergent canopy (20-50% cover, height 50-80'). The subcanopy (40-60% cover, height 30-60') is typically dominated by hophornbeam (*Ostrya virginiana*), but also includes small components of red oak, sugar maple, white ash (*Fraxinus americana*) and bitternut hickory (*Carya cordiformis*). Notably, shagbark hickory (*Carya ovata*) was not observed in this community in the AMU. Shrubs are essentially absent, except for the occasional small striped maple (*Acer pensylvanicum*) or maple-leaf viburnum (*Viburnum acerifolium*). Herb cover is 60-100%, with woodland sedge (*Carex pennsylvanica*) the dominant species (up to 90% cover in places). Other frequent herbs include Canada mayflower (*Maianthemum canadense*), marginal woodfern (*Dryopteris marginalis*), blue-stemmed goldenrod (*Solidago caesia*), and white snakeroot (*Eupatorium rugosum*).

One interesting example of this forest occurs on the summit of Pierson Peak in Little Ascutney WMA. Red oak dominates a short and open canopy (60% closure, 40-50' tall) with a very few sugar maples also present. Hophornbeam is common in the understory (30% cover). Shrubs are mostly absent, and woodland sedge dominates the forest floor. Overall, this community has the stunted and open look of the rare dry oak woodland community, but the species composition is similar to dry oak-hickory-hophornbeam forest. Further inventory efforts may be necessary to best place this patch—overall it is one of the most intriguing oak forests in the AMU.

Several rare and uncommon plants are found in the dry oak-hickory-hophornbeam forests of the AMU, including the state endangered hay sedge (*Carex siccata*). The other uncommon plants are Back's sedge (*Carex backii*) and Bicknell northern crane's-bill (*Geranium bicknellii*).

The role of both natural and human disturbance in this community is poorly understood. The dry oak-hickory-hophornbeam forests in Little Ascutney WMA show clear signs of human land use, including stone walls and open-grown wolf trees; many areas may have once been open field or sparsely wooded pasture. The present-day forest composition and structure may be a result of this history. Additionally, fire may play a role in maintaining the presence of oak and the open, park-like structure in these forests.

### **Dry Oak Forest– S3**

Dry oak forest occurs in warm regions of Vermont on well-drained to excessively well-drained substrates. In the AMU, this community is found in Skitchewaugh WMA and Mt. Ascutney State Park. Two patches of this forest, forming one 8-acre, C-ranked occurrence, are found on small bedrock ridges within Skitchewaugh WMA. Mt. Ascutney State Park has two occurrences of this type, on an eastern ridge (6 acres, B-ranked, and state-significant) and a relatively large occurrence on the south face (50 acres, B-ranked, and state-significant).

The Skitchewaugh WMA forests are on soils of the very rocky Glover-Vershire complex, and field sampling found 12" of sandy loam over bedrock. Many areas had exposed bedrock. A closed canopy (80-90% closed, 70' tall) of oaks includes red oak (*Quercus rubra*), black oak (*Quercus velutina*), chestnut oak (*Quercus prinus*), and white oak (*Quercus alba*). Other hardwood species are occasionally present, but are only a small component. Shrubs are almost

entirely absent, with witch hazel (*Hamamelis virginiana*) appearing every now and then. Herb cover was low (5-15%) and includes bracken fern (*Pteridium aquilinum*), early low blueberry (*Vaccinium angustifolium*), wild cucumber (*Medeola virginiana*), ground pine (*Lycopodium obscurum*), and woodland sedge (*Carex pensylvanica*). This forest contains many of the same species as the surrounding hemlock forest, but these patches are clearly oak-dominated, with hemlock absent in both the canopy and regeneration layers. As with most oak forests in Vermont, the influence of natural and human disturbance is unknown, so it is hard to say if these oak patches are likely to persist, or will ultimately develop similar to the adjacent hemlock forest.

The forests at Ascutney are similar to those described above, but appear to lack the black oak and chestnut oak. Instead, red oak dominates the canopy, with lesser amounts of white pine (*Pinus strobus*), and occasionally hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*) or red spruce (*Picea rubens*). The tall shrub layer is sparse; however, early low blueberry can be an abundant low shrub. Graminoids dominate the herb layer.

Oaks provide an important mast of acorns that deer and many other animals such as turkeys, squirrels, and blue jays feed upon. In addition, these forests can be important deer wintering habitat because the sunny southern slopes often lack the deep snow cover that accumulates on north-facing areas. A variety of native invertebrates, including moths, butterflies, ants, and bees, are dependent on the oaks found in these forests for food, shelter, and nest sites.

Of final note, Pierson Peak in Little Ascutney WMA has a very interesting patch of oak forest that has been mapped in this inventory as dry oak-hickory-hophornbeam forest, but which seems to have much in common with dry oak forest or even the rare dry oak woodland community. Future inventory efforts may want to further study this patch to determine if it is properly classified.

### **Dry Oak Woodland – S2**

Two small patches of this community type can be found on the south slope of Mount Ascutney, in association with shallow bedrock and temperate acidic outcrops. The examples form a single occurrence covering 3.5 acres, and are considered state-significant because this is a rare community type. These patches were inventoried during early April, and at that time did not appear substantially different from the dry oak forest community, except that they occurred on very shallow bedrock and the canopy trees were stunted (approx. 30' tall) and cover averaged only 50-60%.

### **Hemlock-Northern Hardwood Forest – S5**

Forests with eastern hemlock (*Tsuga canadensis*) form the matrix into which all other communities fit in the AMU. Of these, hemlock-northern hardwood forest is identified by the relatively high (on average >50%) proportion of hardwood species in the canopy. Because this community is found across the lower elevations of the Connecticut River Valley as well as

upwards of 2000' in elevation on Mount Ascutney, it is a variable community type. In general, the lower elevation and more southern patches have a higher component of central hardwoods—oaks and hickories—than the more northern patches. Fourteen patches of this community cover a total of 950 acres in the AMU. These are grouped into six occurrences, the largest of which is a 716-acre, B-ranked occurrence at Mt. Ascutney State Park. There are no examples of state significance on the AMU.

Hemlock-northern hardwood forest is typically found on steep rocky slopes or on flatter areas with sandy soils. Field sampling found 4-6" of organic material over rock on a steep (25-30 degree) north facing slope, while other sites had varying depths of sandy loam over bedrock. Wilgus State Park had some of the deepest sand soils, with over 3' of fine sandy-silt loam. Hemlock is ubiquitous in the closed canopy (range 60-100% closure, 60-80' tall) of this community. Other species frequently found in the diverse canopy include sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), and white ash (*Fraxinus americana*). On warmer sites, red oak (*Quercus rubra*), basswood (*Tilia americana*), black birch (*Betula lenta*), white pine (*Pinus strobus*) and bitternut hickory (*Carya cordiformis*) are also likely to be found in the canopy. Red spruce (*Picea rubens*) is frequently in this community on Mount Ascutney, often creating an interesting association of hemlock, oak and spruce. A subcanopy is usually though not always present, averaging 30-40% cover. Species composition most often includes hemlock, red maple (*Acer rubrum*), yellow birch, and beech, but some amount of regeneration was observed for all of the noted canopy species. Tall shrubs are almost always absent, except in a few places where a 10% cover of striped maple (*Acer pensylvanicum*; average 8' tall) is present. Low shrubs include blueberries (*Vaccinium* spp.). Herb cover is also sparse, averaging 20-30% cover. Marginal wood fern (*Dryopteris marginalis*), intermediate wood fern (*Dryopteris intermedia*), ground pine (*Lycopodium obscurum*), starflower (*Trientalis borealis*), wild cucumber (*Medeola virginiana*), and Canada mayflower (*Maianthemum canadense*) are the abundant and recurring herbs.

Wildlife that uses hemlock-northern hardwood forest includes white-tailed deer, which use many softwood forests as wintering habitat. (Only some of the hemlock-northern hardwood forest in the AMU is mapped as deer wintering habitat.) They also feed on mast in areas with hardwoods. Porcupines are often common in forests with hemlock, as are many raptors and warblers.

#### **Hemlock Forest – S4**

Forests with eastern hemlock (*Tsuga canadensis*) form a matrix into which all other communities fit in the AMU. Hemlock forest, which has a limited (average <25%) component of hardwood species in the canopy, is most often found at the lowest elevations of Mt. Ascutney State Park and Little Ascutney WMA. A small patch of hemlock forest is also found on a steep slope in Weathersfield WMA. Altogether, these areas total 927 acres. Two variants of this community, "hemlock-red spruce forest," and "temperate hemlock forest" are described separately in this report. For the purposes of creating occurrences, however, these variants were grouped with the main community type, because ecologically these variants all interact as a large-patch community. In total there are seven occurrences of hemlock forest in the AMU. The largest

occurrence is 465 acres, B-ranked, and considered a state-significant example. Several other smaller patches are also considered state-significant.

Hemlock forests are found on a variety of substrates, and they are frequently but not always on steep slopes. In the lower elevations, these forests occur on deep sandy soil, particularly in small ravines. At higher elevations, they can be found on steep, shallow-to-bedrock soils. (Field sampling found 3-5" organic matter over rock on one of these slopes.) Sometimes the substrate is large boulders, particularly in some of the eastern stream valleys of Mount Ascutney.

Aside from the predominance of hemlock, other species in the canopy can include red oak (*Quercus rubra*), white pine (*Pinus strobus*), red maple (*Acer rubrum*) and black birch (*Betula lenta*). This canopy is generally 70-90' tall and 80-90% closed. In a few cases a taller emergent canopy of hemlock and white pine is present. Secondary and tertiary canopies averaging 30% cover are often present, and are dominated by hemlock because the deep shade of these forests often eliminates most other species. Likewise, shrub cover is very low or non-existent—a 5% cover of striped maple (*Acer pensylvanicum*) is found in one forest. Herbs are nearly as sparse, averaging 15% cover. Abundant species found in most hemlock forests include Christmas fern (*Polystichum acrostichoides*), marginal wood fern (*Dryopteris marginalis*), Canada mayflower (*Maianthemum canadense*) and shining club moss (*Lycopodium lucidulum*). Two non-native species found in the hemlock forest in Mt. Ascutney State Park (close to Route 44A) are common buckthorn (*Rhamnus cathartica*) and a honeysuckle (*Lonicera* sp.)

Most softwood forests, like hemlock forests, are protective winter habitat for white-tailed deer. Much of the hemlock forest in the AMU is not mapped as deer wintering habitat; however, it may still be used by small groups of deer. Porcupines find good habitat in hemlock forests, as do many birds such as northern saw-whet owl and Blackburnian warbler.

### ***Hemlock-Red Spruce Forest (variant of Hemlock Forest)***

At middle elevations on Mount Ascutney, hemlock forest can have a significant component of red spruce (*Picea rubens*) in the canopy. Because of the steep slopes of Mount Ascutney, spruce appears to disperse easily to low elevations, and it is not uncommon in many communities where it might otherwise be more unusual. There are six patches in the AMU (all on Mount Ascutney) where hemlock (*Tsuga canadensis*) and red spruce are thought likely to persist as co-dominants in the canopy, covering 170 acres.

This forest has a 70' tall, 60-90% closed canopy of red spruce and hemlock, with occasional white birch (*Betula papyrifera*). A subcanopy (approximately 35-50' tall, average 30-40% cover) includes red spruce, hemlock, and balsam fir (*Abies balsamea*). A shrub layer or third canopy includes all these species plus striped maple (*Acer pensylvanicum*) and a lesser amount of yellow birch (*Betula allegheniensis*) and mountain ash (*Sorbus americana*). Herb cover is limited (10-20%) and includes marginal wood fern (*Dryopteris marginalis*), intermediate wood fern (*Dryopteris intermedia*), bluebead lily (*Clintonia borealis*) and common polypody (*Polypody virginianum*). Moss is sometimes present, but usually only a small component (<10% cover). Animals that use this forest are likely similar to those that use hemlock forests.

In general, the patches mapped as hemlock-red spruce forest should be considered provisional, because it is difficult to discern if the two namesake species will remain co-dominant in the canopy. Of note as well, in the most northwestern patch of this community variant, along the Brownsville Trail, a stand of red pine (*Pinus resinosa*) is overtopping the spruce and hemlock. This is likely a natural successional dynamic, perhaps resulting from fire. In the absence of future disturbance, red pine is unlikely to persist once the spruce and hemlock reach the canopy.

### ***Temperate Hemlock Forest (variant of Hemlock Forest)***

This is a recently described variant of hemlock forest (Sorenson 2006). It encompasses hemlock forests that have a substantial component of hardwood species more commonly found south of Vermont, such as oaks and hickories. All the forests with hemlock (hemlock forest, hemlock-red spruce forest, hemlock-northern hardwood forest, and temperate hemlock forest) are closely related and intergrade. This variant appears mostly at the lowest elevations of the Connecticut River valley, and on south-facing slopes; it covers a total of 344 acres in the AMU.

The most clearly defined example of this type is found throughout much of Skitchewaug WMA, and the description presented here is based largely on this example. Hemlock (*Tsuga canadensis*) is most common (60-90%) in the closed (80-90%, 70' tall) canopy. Oaks were second most abundant, including red oak (*Quercus rubra*), black oak (*Quercus velutina*), and chestnut oak (*Quercus prinus*). Sugar maple (*Acer saccharum*) and bitternut hickory (*Carya cordiformis*) are occasional. Black birch (*Betula lenta*), red maple (*Acer rubrum*) and white pine (*Pinus strobus*) are frequent in disturbed areas with young forest. Butternut (*Juglans cinerea*) is an uncommon tree, but the few individuals in the forest at Skitchewaug WMA did not appear infected with the butternut canker disease. Native shrub species are almost entirely absent, but non-native and invasive barberries (*Berberis* spp.) and honeysuckles (*Lonicera* spp.) are abundant throughout Skitchewaug WMA. Starflower (*Trientalis borealis*), Canada mayflower (*Maianthemum canadense*) and wild cucumber (*Medeola virginiana*) are the primary species in the sparse (5-10% cover) herb layer. An uncommon mammal species, pine vole, was collected in a survey along a stone wall in this community (Kilpatrick 2009). Other animals that use this forest are similar to those that use hemlock forests. In addition, much of the temperate hemlock forest in Skitchewaug WMA is mapped as deer wintering area.

### **Hemlock-Balsam Fir-Black Ash Seepage Swamp – S4**

Described by Thompson and Sorenson (2000) as “hemlock swamp,” a more recent classification (Sorenson and Farrell 2007) distinguishes this type of groundwater-enriched hemlock swamp from a more acidic type (hemlock-sphagnum acidic basin swamp, below). In the AMU, four examples of this type are found in Skitchewaug WMA, covering a total of about 7 acres. These are grouped into one B-ranked occurrence, which is considered a state-significant example of this uncommon natural community type.

Soils are mapped by the NRCS as Cabot Silt Loam or Glover-Vershire Complex, and field sampling showed that while an organic layer was occasionally present, the substrate was primarily mineral soil. In one swamp, a hardpan layer was found at 24” below the surface; on that day the water table was found at only 8” below the surface. Standing water and hummock-hollow microtopography is present in these swamps. No pH readings were taken in these swamps, but the species composition is consistent with a moderately acidic pH.

The canopy of this community (50-60% cover, up to 60’ tall) is dominated by hemlock (*Tsuga canadensis*), yellow birch (*Betula allegheniensis*), and red maple (*Acer rubrum*). Balsam fir (*Abies balsamea*) was not noted during field inventories though it may be a minor component in these swamps. One example was clearly successional, with a tall canopy of white pine (*Pinus strobus*) and red maple above a secondary canopy of hemlock and black ash (*Fraxinus nigra*). Outside of this swamp, there are no distinct lower canopy layers. Shrub cover varies (20-30% average cover) with a tall shrub layer of alder-leaved buckthorn (*Rhamnus alnifolia*), highbush blueberry (*Vaccinium corymbosum*) and witch hazel (*Hamamelis virginiana*). Low shrubs include meadowsweet (*Spiraea alba*), a willow (*Salix* sp.) and in some cases, the non-native and invasive Japanese barberry (*Berberis thunbergii*). Herb cover is 80-90%, covering most ground that did not have standing water. Abundant species include cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), and water avens (*Geum rivale*). Other species include royal fern (*Osmunda regalis*), turtlehead (*Chelone glabra*), mad-dog skullcap (*Scutellaria latifolia*), and common rush (*Juncus effusus*). Bryophyte cover was limited in these swamps, with some sphagnum mosses (*Sphagnum* spp.) present.

These swamps are located within a larger area of upland hemlock-hardwood forest, and are mapped as deer wintering habitat because the softwood cover provides protection from snow and wind. Winter wrens use the low woody debris and tip-up mounds as nesting sites, and amphibians probably use the pools of water as for breeding and laying eggs.

### **Hemlock-Sphagnum Acidic Basin Swamp – S2**

Two small examples of this community occur in Skitchewaugh WMA. Described by Thompson and Sorenson (2000) as “hemlock swamp,” a more recent classification (Sorenson and Farrell 2007) distinguishes this type of acidic hemlock swamp from a more enriched type (hemlock-balsam fir-black ash seepage swamp, above). This community covers approximately one acre in the AMU, is a C-ranked occurrence, and is considered state-significant.

In topographic location, structure, and species composition, these two hemlock-sphagnum acidic basin swamps are similar to the red maple-black gum swamps found on Skitchewaugh Mountain, except that they lack black gum (*Nyssa sylvatica*). Given the small size and close proximity of these swampy basins, it does not seem unreasonable to surmise that the vagaries of dispersal, competition and disturbance may have as much influence on the presence or absence of black gum as any physical characteristics of the swamps. In particular, because black gum is bird dispersed, it seems entirely possible that seedlings could become established in these swamps. If black gum someday becomes a canopy component, it may make sense to reclassify these swamps. At the least, they serve as potential habitat for a nearby rare species.

Found in small bedrock basins with approximately 4' of peat and muck over silt and clay, these swamps have a patchy canopy (60% cover) with hemlock (*Tsuga canadensis*) and red maple (*Acer rubrum*). Other species include yellow birch (*Betula allegheniensis*) and black ash (*Fraxinus nigra*). Shrubs cover is thin but includes the tall shrubs highbush blueberry (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). Sphagnum moss (*Sphagnum* sp.) forms hummocks, with patches (up to 35%) of exposed muck and standing water. The herb layer lacks species that might indicate mineral enrichment. Cinnamon fern (*Osmunda cinnamomea*) dominates the herb layer, which also includes three-seeded sedge (*Carex trisperma*) and goldthread (*Coptis trifolia*).

These swamps are mapped as deer winter habitat, along with the adjacent softwood forest. The blueberry and winterberry bushes may provide an important food source for many birds and some small mammals in the fall and into the winter.

### **Mesic Maple-Ash-Hickory-Oak Forest – S3**

Northern and central hardwood species mix in this uncommon natural community type found in the warmer regions of the state. Seven patches of mesic maple-ash-hickory-oak forest have been mapped in the AMU, covering 344 acres. Most of these are small (<15 acres) but one patch covers over 200 acres in Little Ascutney WMA. This large patch includes a logged area and an old field white pine (*Pinus strobus*) stand, so it should be considered somewhat provisional. Together, these patches form five occurrences, all of which are C-ranked except for one B-ranked, state-significant occurrence on the south face of Ascutney Mountain.

This community occurs on glacial till soils of variable depths. Field sampling in one patch found very shallow soils (2-6" organic matter) over rock, but other locations probably have somewhat deeper soil. A diverse canopy (60-90% closure, 60-90' tall) of sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), bitternut hickory (*Carya cordiformis*), basswood (*Tilia americana*), and red oak (*Quercus rubra*) predominates. Other occasional species in the canopy include beech (*Fagus grandifolia*), hemlock (*Tsuga canadensis*), hophornbeam (*Ostrya virginiana*), and yellow birch (*Betula alleghaniensis*). White pine and white birch (*Betula papyrifera*) are successional species. A subcanopy of hophornbeam, beech, white ash, and sugar maple is sometimes present, averaging 30-40% cover, and up to 50' tall. A tertiary canopy with similar species averages 20% cover, and is up to 20-30' tall. Tall shrub cover (20%) includes striped maple (*Acer pensylvanicum*); low shrubs cover (also 20%) includes red raspberry (*Rubus idaeus*) and elderberry (*Sambucus racemosa*). Herb cover ranges widely (15-60%, average 30%), and abundant species include marginal wood fern (*Dryopteris marginalis*), Canada mayflower (*Maianthemum canadense*), drooping wood reed (*Cinna latifolia*), intermediate wood fern (*Dryopteris intermedia*) and several bedstraws (*Gallium* spp.). Slightly richer sites in this community had blue-stemmed goldenrod (*Solidago caesia*) and particularly rich micro-sites (often at the base of small gullies) had maidenhair fern (*Adiantum pedatum*). Basswood, oak, and hickory seedlings were commonly noted in this community.

Wildlife using mesic maple-ash-hickory-oak forests includes some common species like white-tailed deer, eastern chipmunk and grey squirrel. Ovenbirds, scarlet tanagers and turkeys are some

birds which prefer to use forests with an oak or hickory component, and which might be less common in softwood or northern hardwood forest.

#### **Mesic Red Oak-Northern Hardwood Forest – S4**

In warmer regions of Vermont, forests with northern hardwood species can also include a significant component of red oak (*Quercus rubra*) in the canopy. When this occurs, and the oak appears likely to persist, these forests are mapped as mesic red oak-northern hardwood forest. Nine patches of this community type, varying in size from 2 to nearly 200 acres, were mapped in the AMU. In total, mesic red oak-northern hardwood forest was mapped on 528 acres and constitutes four occurrences, which are B and C-ranked. The occurrences of this community in Mt. Ascutney State Park and Little Ascutney WMA are considered state-significant examples.

This forest is typically found on glacial till soils of the Berkshire-Tunbridge, Tunbridge-Lyman, Hogback-rock outcrop-Rawsonville, and Glover-Vershire complexes. One occurrence of this community type is also found on Windsor fine loamy sand, a glacio-fluvial soil, at Wilgus State Park. In structure these forests are similar to northern hardwood forests, although drier sites may have sparser shrub and herb layers. The driest sites would grade into dry oak forest or dry oak-hickory-hophornbeam forest communities. Canopy cover ranges from 70-90%, and averages 80-90' tall. Abundant species include red oak, sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), yellow birch (*Betula alleghaniensis*), beech (*Fagus grandifolia*), and hemlock (*Tsuga canadensis*). Black birch (*Betula lenta*) and white birch (*Betula papyrifera*) are successional species occasional found in this community. On the steep southern slopes of Mount Ascutney, red spruce (*Picea rubens*) is not uncommon. Subcanopy layers are not always present, but when they are they include the canopy species, plus hophornbeam (*Ostrya virginiana*) and striped maple (*Acer pensylvanicum*). Tall shrubs (average 15% cover) include red raspberry (*Rubus idaeus*), maple-leaf viburnum (*Viburnum acerifolium*), hobblebush (*Viburnum lantanoides*) and skunk current (*Ribes glandulosum*). Blueberries (*Vaccinium* spp.) are the only low shrubs found in this community, and these are primarily on drier sites. Herb cover ranges from 10% to near 80%, and probably depends on the moisture available at any particular site. Dry sites typically have fewer herbs, while more mesic sites had a diverse suite of herbs. Frequently noted species include whorled aster (*Oclemena acuminata*), sessile-leaved bellwort (*Uvularia sessilifolia*), partridge berry (*Mitchella repens*), intermediate wood fern (*Dryopteris intermedia*), blue-stemmed goldenrod (*Solidago caesia*), Christmas fern (*Polystichum acrostichoides*), and two clubmosses (*Lycopodium annotinum* and *Lycopodium obscurum*). On drier sites, bracken fern (*Pteridium aquilinum*) is quite common. Mosses are uncommon. Many songbird species were heard or observed in this community, including yellow-bellied sapsucker, hermit thrush, black-and-white warbler, ovenbird, red-breasted grosbeak, eastern wood peewee, and hairy woodpecker. Turkeys and white-tailed deer likely forage on oak mast in this community.

### **Montane Spruce-Fir Forest – S3**

This uncommon community is found in the AMU only at the highest elevations of Mount Ascutney. It does not form one continuous patch, but instead is closely associated with montane yellow birch-red spruce forest. These patches cover 93 acres and form one B-ranked occurrence which is a state-significant example of this community.

Red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) are the primary species in the closed canopy, reaching 35-50' in height. Individual stands can be dominated by one species or the other, perhaps owing to disturbance history. In the areas visited during this inventory, the trees were small, with the maximum DBH (diameter at breast height) rarely exceeding 8". Yellow birch (*Betula allegheniensis*) and heart-leaved paper birch (*Betula papyrifera* var. *cordifolia*) are occasional in the canopy, also probably a result of disturbance. Some birch-dominated areas can be found near the top of the auto road. A secondary canopy in these forests is similar to the overstory (20'-30' tall, 20-60% closed), with the addition of American mountain ash (*Sorbus americana*). In places an impenetrable thicket of small balsam fir can form. Because of the dense overstory, shrubs are mostly absent and herbs are limited (<25% cover). Canada mayflower (*Maianthemum canadense*), sarsaparilla (*Aralia nudicaulis*), starflower (*Trientalis borealis*), bluebead lily (*Clintonia borealis*), and mountain woodfern (*Dryopteris campyloptera*) are frequent herb species. In places, mosses are abundant on the forest floor, and blowdowns can create areas with thick woody debris.

The montane spruce-fir forest community is habitat for Bicknell's thrush, which breeds only in high-elevation spruce-fir forests in New England, New York and Canada, and which is a species of special concern in Vermont. While there are historic records of Bicknell's thrush from Mount Ascutney, no individuals have been detected in recent surveys by the Vermont Institute of Natural Science's Mountain Birdwatch program (VINS 2008). These results do not necessarily indicate that Mount Ascutney is no longer suitable habitat; the loss of winter habitat in the tropics may be to blame. In addition to Bicknell's thrush, several other birds make use of this high-elevation habitat, and surveys since 2001 on Mount Ascutney have detected blackpoll warbler (which only uses higher elevation habitat), along with Swainson's thrush, winter wren, and white-throated sparrow (which use conifer habitat at all elevations).

### **Montane Yellow Birch-Red Spruce Forest – S3**

Montane yellow birch-red spruce forest occurs on the higher slopes (mostly above 2000') of Mount Ascutney, where it is situated roughly between the lower northern hardwood forest and the montane spruce-fir forest of the highest elevations. Though mapped as separate patches, some of these may be connected by small bands of this community that run off state land (through the West Windsor Town Forest). Taken together these patches are considered one occurrence with 404 acres on state land. This occurrence is a state-significant example of this community type.

This community occurs primarily on soils mapped by the NRCS as the Glebe-Stratton Complex and the Hogback-Rock outcrop-Rawsonville Complex. These are steep (>30 deg.), shallow (10-

40”) and very rocky soils derived from glacial till. Field sampling on a gentler slope than average (15-20 deg.) found 2.5’ of fine sandy loam over rock. Small (1/10<sup>th</sup> acre or less) seepy areas are not uncommon in this community, and these usually have thin canopy cover and a dense layer of cinnamon fern (*Osmunda cinnamomea*).

In general, however, tree canopy cover ranges from 70-95%, and is 40-70’ in height. As the name implies red spruce (*Picea rubens*) and yellow birch (*Betula allegheniensis*) are the dominant trees, though heart-leaved paper birch (*Betula papyrifera* var. *cordifolia*) and balsam fir (*Abies balsamea*) were sometimes present as well. Most areas of this community on Mount Ascutney are spruce-dominated, but in a few cases birches are more abundant. A secondary canopy containing striped maple (*Acer pensylvanicum*), beech (*Fagus grandifolia*), American mountain ash (*Sorbus americana*) and mountain maple (*Acer spicatum*), in addition to the canopy species already noted, is sometimes present (10-40% cover). The low shrub hobblebush (*Viburnum lantanooides*) can be present in varying abundance. Herb cover is generally around 70%; abundant species include mountain woodfern (*Dryopteris campyloptera*), whorled aster (*Oclemena acuminata*), sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), and shining club-moss (*Lycopodium lucidulum*). In sunny canopy gaps, hay-scented fern (*Dennstaedtia punctilobula*) can form a nearly unbroken carpet, possibly limiting future tree regeneration. Moss is a small component of this community, though pincushion moss (*Leucobryum glaucum*) and sphagnum mosses (*Sphagnum* spp.) are occasionally present.

Note that some areas of this community type have been mapped provisionally, because it was unclear if these areas would ultimately develop montane yellow birch-red spruce forest or montane spruce-fir forest. Further inventory efforts will be necessary to properly place these patches.

## **Northern Hardwood Forest – S5**

Northern hardwood forest is the most abundant forest type in Vermont. But although it covers a large area of the AMU (731 acres), it is not the “matrix” community that it is in many other parts of the state. (Instead, hemlock-dominated forests form the matrix that all other communities fit into.) In the AMU, it is most often found at middle elevations on east or northeast facing slopes, and it is not found on any of the parcels located in the Connecticut River Valley. This community encompasses much variation, but is most often found on rocky glacial till soils of the Tunbridge-Lyman or Hogback-Rawsonville complexes. Field sampling found soils to be quite variable (even around the same site) with silty or sandy loams that were 4-30” deep to rock. Surface outcrops, along with cobble and boulders are quite common. In particular, many of the sharp stream valleys in Mt. Ascutney State Park have areas with steep and rocky slopes, though not so boulder-strewn to be classified as talus woodland communities. On steep slopes with deeper soils, colluvial (downhill) soil movement has created small enriched pockets that are not large enough to be classified as rich northern hardwood forest. These seem to be most common on shady northeast-facing slopes.

Canopy cover is usually closed and tall (>85% closure, 70-90’ tall), composed primarily of sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), American beech (*Fagus grandifolia*),

and, in rocky areas, yellow birch (*Betula alleghaniensis*). Red oak (*Quercus rubra*) and hemlock (*Tsuga canadensis*) are occasionally present, as is red spruce (*Picea rubens*) at higher elevations. Sugar maple is almost ubiquitous in this community, with white ash more prominent in slightly enriched areas, and yellow birch and beech more common on convex slopes and other dry and less nutrient-rich areas. A secondary canopy (average 30-40% cover, 40' tall) is dominated by sugar maple and beech, though all species of the overstory are present in one place or another. The tertiary canopy (average 20-30% cover, 20' tall) is similar, but with a more even mix of all the tree species. Both tall and short shrub cover each averages 20-30%; but shrubs are sometimes absent, and other times a nearly impenetrable thicket. Beech and striped maple (*Acer pensylvanicum*) are abundant tall shrubs. Abundant short shrubs include hobblebush (*Viburnum lantanoides*), striped maple, and in lesser abundance the regeneration of tree species.

Herb cover averages 25%, and species composition varies depending on site conditions. In most places, intermediate wood fern (*Dryopteris intermedia*), marginal wood fern (*Dryopteris marginalis*), white snakeroot (*Eupatorium rugosum*), rose twisted stalk (*Streptopus roseus*), Christmas fern (*Polystichum acrostichoides*), white wood aster (*Aster divaricatus*), and sedges (*Carex* spp.) were present if not abundant. Slightly richer sites can have these same species, and also blue-stemmed goldenrod (*Solidago caesia*), jack-in-the-pulpit (*Arisaema triphyllum*), and plantain-leaved sedge (*Carex plantaginea*).

This community is divided into two occurrences, both of which are B-ranked.

### **Northern Hardwood Talus Woodland – S3**

A small (3-acre) occurrence of this community was noted on an eastern ridge of Mount Ascutney. It is divided into two patches. The rock substrate is a white-pink igneous rock in blocks 12" to 4' in size. The canopy is dominated by sugar maple (*Acer saccharum*) and yellow birch (*Betula alleghaniensis*), up to 15" DBH, though most are pole-sized to 12". Shrubby hophornbeam (*Ostrya virginiana*) is occasional. Striped maple (*Acer pensylvanicum*), wake-robin (*Trillium erectum*), Christmas fern (*Polystichum acrostichoides*), and marginal wood fern (*Dryopteris marginalis*) are all abundant.

Northern Hardwood talus woodland is suitable habitat for two rare mammal species, long-tailed shrew and rock vole, but neither species was found during small mammal surveys of the AMU (Kilpatrick 2009).

### **Red Maple-Black Ash Seepage Swamp – S4**

Though only one three-acre, C-ranked occurrence of this community is found in Weathersfield WMA, this is the most common hardwood swamp type found in Vermont. Called "red maple-black ash swamp" by Thompson and Sorenson (2000), a more refined classification (Sorenson et al. 2004) identifies this type as a separate community. As a seepage swamp with mineral enrichment, this community seems closely related to the hemlock-balsam fir-black ash swamps

found at Skitchewaug WMA. Future natural community inventory within the AMU might focus on the relationship of these softwood and hardwood swamps.

The one example in the AMU is found in a low valley adjacent to I-91. The soils are mapped by the NRCS as Cabot Loam, a deep loam (>60") but with a shallow (0-2") perched water table. Field sampling found 42" of moderate to well-decomposed peat, with a pH of 5.8-6.0. A sparse emergent canopy (15% closure, 80-90' tall) of white pine (*Pinus strobus*) overtops a closed canopy (70%, 50-60' tall) of black ash (*Fraxinus nigra*), red maple (*Acer rubrum*) and hemlock (*Tsuga canadensis*). A variable understory canopy of black ash, hemlock, and red maple is also present. The shrubs winterberry (*Ilex verticillata*) and beaked hazelnut (*Corylus cornuta*) cover about 20% of the area. Abundant herbs include cinnamon fern (*Osmunda cinnamomea*), goldthread (*Coptis trifolia*), Canada mayflower (*Maianthemum canadense*), and bunchberry (*Cornus canadensis*). Other species indicative of seepage include water avens (*Geum rivale*), swamp saxifrage (*Saxifraga pensylvanica*) jewelweed (*Impatiens capensis*), and fringed sedge (*Carex crinita*). Bryophyte cover is 30%, mostly on fallen logs and root masses; *Sphagnum* moss is uncommon.

Hardwood swamps such as these, with their hummock and hollow topography and standing water can provide important habitat for a number wildlife species, including the northern two-lined salamander, wood frogs, northern waterthrush, green heron, and the uncommon southern bog lemming.

A 1992 survey by Vermont Nongame and Natural Heritage Program ecologists found that this swamp was one of the higher-quality forested swamps in the town of Weathersfield, despite the proximity to the highway. The wetland shows little evidence to indicate water level alterations.

## **Red Maple-Black Gum Swamp – S2**

Red Maple-Black Gum Swamps are an important natural community in Vermont. Black gum (*Nyssa sylvatica*) is a southern tree and is found in only a few areas of the state, therefore swamps that are defined by this tree are quite rare (Johnson 1998). Several Red Maple-Black Gum Swamps are found on Skitchewaug Mountain, together comprising one occurrence of this community, but only a 0.5 acre portion occurs on state land in Skitchewaug WMA. This occurrence is an A-ranked example, and is a state-significant example of this rare natural community type.

The swamp on state land is perched in a small bedrock basin, with deep peat and muck soils over gleyed silt and sand. Hummock-and-hollow topography is well-developed. The closed canopy (60-70' tall) is composed primary of hemlock (*Tsuga canadensis*) and red maple (*Acer rubrum*). Black gum (*Nyssa sylvatica*) is only a minor canopy component, averaging 10% throughout the three swamps known on Skitchewaug. Just one individual of black gum (approx. 14" dbh, 60-70' tall) was noted on state land. Other canopy trees in the swamp include yellow birch and white pine. A thin sub-canopy of pole-sized yellow birch, hemlock, and black ash (*Fraxinus nigra*) is present, and the equally thin layer of shrubs includes highbush blueberry (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). The herb layer (70% cover) is dominated by

cinnamon fern (*Osmunda cinnamomea*), with goldthread (*Coptis trifolia*), three-seeded sedge (*Carex trisperma*), starflower (*Trientalis borealis*), and wild cucumber (*Medeola virginiana*) also abundant. In 1999, the state-uncommon yellow water-buttercup (*Ranunculus flabellaris*) was found in one of the nearby red maple-black gum swamps on Skitchewaog Mountain, but has not been found on state land. Mosses are abundant, with *Sphagnum* species in wet areas and *Pleurozium* moss on the drier hummocks.

Red maple-black gum swamps are important habitat for wildlife, including amphibians that need temporary pools of water during their breeding seasons. Winterberry can be an important food source for birds in the late fall and early winter, and small flocks of chickadees, red-breasted nuthatches, and downy woodpeckers were frequently observed in all the Skitchewaog hardwood swamps. There are insects whose life histories are entirely dependent on black gum (Davis 1964), and these may inhabit the swamps. And a characteristic assemblage of native bees gathers nectar and pollen from the tree, attracted by a unique floral attraction that uses nectar to concentrate sunlight (Batra 1999).

Two nearby hemlock-sphagnum acidic basin swamps in Skitchewaog WMA are similar to the red maple-black gum swamp described here, except they lack black gum. It is possible they are closely related; see “hemlock-sphagnum acidic basin swamp” for more information.

### **Red Spruce-Red Oak Forest – not ranked**

An unusual forest type of red oak (*Quercus rubra*) and red spruce (*Picea rubens*) can be found on the steep, south-facing slopes of Mount Ascutney. There are two occurrences mapped, and in both examples 8”+ dbh red oak and red spruce form a closed canopy, with occasional beech (*Fagus grandifolia*), white pine (*Pinus strobus*), or red maple (*Acer rubrum*). Striped maple (*Acer pensylvanicum*) is a common understory associate. The spruce is generally more abundant than oak, but this varies. This landscape is rocky and generally dry. In more mesic places yellow birch (*Betula alleghaniensis*) and red maple appear to replace oak in the canopy. Bracken fern (*Pteridium aquilinum*) and Canada mayflower (*Maianthemum canadense*) were common herbs. Regeneration layers are present in places, but oak regeneration appeared absent or uncommon. Wind and/or fire may play a role in the development of this forest type.

At higher elevations, the eastern occurrence of this community takes on characteristics of a montane spruce forest, with steep, dry and rocky ground, but the red oak and white pine remain abundant in the canopy. This patch has been denoted as a variant on the natural community map.

Because this forest type covers a substantial area—89 acres—of the AMU, and appears to be unusual in Vermont, it is worthy of further study. The unique association of canopy species may provide habitat for uncommon wildlife species, particularly insects. These patches are probably worthy of further study to better understand their species composition and the ecological processes at work.

## **Rich Northern Hardwood Forest – S4**

This forest type typically develops on soils that have high concentrations of calcium and other important plant nutrients. Most often, this is a result of colluvial (downhill) movement of soil, which concentrates nutrient-rich humus on lower slopes. When it is close to the surface, calcareous bedrock such as limestone or dolostone can often be a source of these nutrients as well. It is not uncommon to find small areas of groundwater seepage in rich northern hardwood forests, and this water can be another source of nutrient input.

While numerous slightly enriched areas of northern hardwood forest are found within the AMU, only two patches (totaling 24 acres) of true rich northern hardwood forest have been identified, one in Weathersfield WMA and the other along an eastern stream valley of Mount Ascutney. Colluvial soil movement influences both of the patches and the Weathersfield patch is found in part on calcareous bedrock. Soils are silt loams, variable in depth. At Weathersfield WMA, this community is on a very steep (50-60 degree) slope and the bedrock is close to the surface, with many small outcrops. The patch in Mt. Ascutney State Park is on a steep slope, and along the base of the stream valley.

The availability of nutrients makes for a highly productive forest. Sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), and basswood (*Tilia americana*) form a closed canopy (80-100%, up to 80-90' tall). Beech (*Fagus grandifolia*), red oak (*Quercus rubra*) and hemlock (*Tsuga canadensis*) are sometimes found in the canopy as well. A variable understory canopy is sometimes present, generally mirroring the overstory. Shrub cover is around 30%, primarily with striped maple (*Acer pensylvanicum*), and uncommonly, witch hazel (*Hamamelis virginiana*). Rich northern hardwood forest herbs are distinctive, and many areas have beautiful displays of spring wildflowers. Abundant herbs noted in this late-summer inventory include blue cohosh (*Caulophyllum thalictroides*), white baneberry (*Actaea pachypoda*), plantain-leaved sedge (*Carex plantaginea*), maidenhair fern (*Adiantum pedatum*), silvery glade fern (*Deparia acrostichoides*), and scouring rush (*Equisetum hyemale*). The non-native and invasive Japanese barberry (*Berberis thunbergii*) was found at the western edge of the patch in Mt. Ascutney State Park. This species is only moderately tolerant of the deep shade of the closed maple-ash canopy, but could spread and out-compete native plants if disturbance creates canopy gaps and allows more light to reach the forest floor.

Two occurrences of this community, totaling about 24 acres, have been mapped in the AMU. They are both C-ranked.

## **Rivershore Grassland – S3**

Rivershore grassland communities are found along large rivers, where the seasonal flooding and ice scouring keeps woody vegetation from establishing. One patch of this community was found in the AMU, along the Connecticut River in Wilgus State Park. This one occurrence covers 5 acres, and is C/D-ranked because of its size and disturbance history.

Herbs and shrubs less than 4' tall dominate (90% cover) this example. Patches of exposed sand are visible where vegetation is absent, and field sampling found a sand/cobble substrate. Located 5-10' above the mid-summer water level, this community probably experiences periods of drought during times of low water, as well as periods of saturation or inundation during times of flooding. In addition, at least one area of riverside seepage was noted within this community, which hosted slightly different species.

Shrub species (all <4' tall) noted include box elder (*Acer negundo*), quaking aspen (*Populus tremuloides*), as well as elms (*Ulmus* spp.) and willows (*Salix* spp.). Herb species were quite numerous and diverse and include many graminoids, as well as many non-native weed species. The non-native reed canary grass (*Phalaris arundinacea*) is very abundant in this community. Other frequent non-native species include oxeye daisy (*Chrysanthemum leucanthemum*), common St. Johnswort (*Hypericum perforatum*) and soapwort (*Saponaria officinalis*). Abundant native species include common cocklebur (*Xanthium strumarium*), deer-tongue grass (*Panicum clandestinum*), Indian hemp (*Apocynum cannabinum*), a bedstraw (*Gallium* sp.), red raspberry (*Rubus idaeus*) and swamp milkweed (*Asclepias incarnata*). The seepage area had abundant bulrush and rush species (*Scirpus* and *Juncus* spp.), along with a spikerush (*Eleocharis* sp.) and blue flag iris (*Iris versicolor*).

Riverside communities are important wildlife habitat for many species of reptiles and amphibians, such as the leopard frog, green frog, and wood turtle. Otter and mink travel and forage along river edges. The tunnels of somewhat uncommon (S3S4) species, hairy-tailed mole, were noted as abundant in sandy soils along the river in this community (Kilpatrick 2009). A population of the federally-endangered and globally rare dwarf wedge mussel (*Alasmidonta heterodon*) is known in the Connecticut River near the south end of Wilgus State Park. This mussel uses patches of silty or sandy riverbed as habitat, and shoreline natural communities, such as rivershore grassland, play an important role in maintaining and replenishing these sediment patches.

### **Sandy Slope Seepage Forest – not ranked**

This is an unusual community that does not seem to fit neatly into any existing natural community types, thus it is being described separately. Further refinement of the classification system may eventually identify this as a new community or variant type, or group it within an existing community.

Just one acre of this community is on state land, and only a very small (~0.5 acre) additional portion extends onto the adjacent private land. It is found on the west side of the wetland parcel of Hoyts Landing Access Area in Springfield, on a steep sandy slope above the wetland. The NRCS has mapped the soil as Ninigret fine sandy loam, which is of glacio-fluvial origin and is at least 60" to bedrock. Field sampling at the top of the slope found approximately 48" of very fine sand. Sand soils like the Ninigret series are well-drained to excessively well-drained and typically support "dry" communities such as white pine-red oak-black oak forest, but this slope appears to have seepage both on the slope and in places on the plateau above the slope, which may be the result of impermeable clay or silt layers that were not detected in field sampling.

Whatever the cause, this community supports dry-site species as well as some species more typical of mesic-to-wet environments. A closed canopy (85-100%) of 70-80' tall trees is dominated by red oak (*Quercus rubra*), but also contains hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), black cherry (*Prunus serotina*), red maple (*Acer rubrum*) and beech (*Fagus grandifolia*). A few of the oaks on the property boundary are old fence trees, and have grown to be an impressive four feet or larger in diameter. A secondary canopy of small trees and tall shrubs includes witch hazel (*Hamamelis virginiana*), musclewood (also sometimes called ironwood; *Carpinus caroliniana*), shagbark hickory (*Carya ovata*), and basswood (*Tilia americana*). Herb species include marginal woodfern (*Dryopteris marginalis*), long beech fern (*Phegopteris connectilis*), and Christmas fern (*Polystichum acrostichoides*). A grapefern (*Botrychium* sp.) was found, but without enough material to positively identify it. The two herbs most indicative of seepage were sensitive fern (*Onoclea sensibilis*) which is on the slope in places, and scouring rush (*Equisetum hyemale*) which is on both the slope on the sandy plateau above, where it is very frequent. Non-native and invasive honeysuckles and barberries (*Lonicera* spp. and *Berberis* spp.) are abundant on the adjacent private land, and some individuals have spread onto state land. Also on state land is the non-native and invasive winged burning bush (*Euonymus alatus*), which is currently uncommon in Vermont but perhaps becoming more common. Like honeysuckle and barberry species, it has the potential to form dense thickets that exclude native vegetation.

Because this community is small and surrounded by several busy roads, it is unlikely to be ideal habitat for the species like deer, turkey and bear, that often feed on mast in oak forests. The community's proximity to a wetland complex and the Connecticut River, however, may make it good habitat for many bird species, such as kingfisher, which nests in sandy banks. Raptors may use the large trees for perches or nesting sites, though no evidence of this was noted during field inventories.

This community was provisionally given a C-rank for its small size and the presence of invasive species.

#### **Seep – S4**

Just over 1.5 acres of an open seep community was mapped in Little Ascutney WMA. This community has elements of a small floodplain community as well, because a small stream forms and winds through this patch. When sampled, soils were damp sand/silt loams. A handful of short (~30' tall) scattered trees make up the canopy; these are American elm (*Ulmus americana*) and white ash (*Fraxinus americana*). Invasive honeysuckles (*Lonicera* spp.) are common around the edges of this wetland, but shrubs are otherwise absent within the seep. Herb cover is near 100% with a dense cover of cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), and jewelweed (*Impatiens capensis*). Seeps provide important habitat openings used by many wildlife species. The forest surrounding this seep appears to be re-growth from old fields, and so it is likely that this seep was disturbed by agricultural use as well. In part because of this likely history, this occurrence is C-ranked.

### **Shallow Emergent Marsh – S4**

Two examples of Shallow Emergent Marsh, totaling five acres, were identified in the AMU. One is in Skitchewaug WMA; the other is in the wetland parcel of Hoyt's Landing Access Area. In general these marshes are quite variable, but all have standing water for at least a portion of the growing season. Soils are typically muck or mucky-mineral soils.

The marsh in Skitchewaug WMA is adjacent to I-91. The soil is saturated and composed of 2' of peat over at least another 2' of mucky peat – an unusual soil type for this community, perhaps suggesting that this may in fact be a highly disturbed Hemlock Swamp or Red Maple-Black Gum Swamp. A very sparse canopy (10% cover) is dominated by white pine (*Pinus strobus*) and has small components of red maple (*Acer rubrum*), and eastern hemlock (*Tsuga canadensis*) which is present around the edges of the marsh. Scattered clumps of willows (*Salix* spp.) make up the tall shrub layer, while black huckleberry (*Gaylussacia baccata*) and shrubby cinquefoil (*Potentilla fruticosa*) make up the short shrub layer. Herbs are abundant and some indicate slight mineral enrichment. A selected list of abundant species includes cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), poison ivy (*Toxicodendron radicans*), cattail (*Typha latifolia*), fringed sedge (*Carex crinita*), and water avens (*Geum rivale*). At the edge of I-91, off state land, this marsh becomes dominated by common reed (*Phragmites australis*), an invasive species which can form dense clonal patches and invade wetlands to the exclusion of all other species. It is likely only a matter of time before this species spreads into the state-owned portion of the marsh. Additionally, invasive honeysuckles (*Lonicera* spp.) and barberries (*Berberis* spp.) are common in Skitchewaug WMA, and could become abundant in this wetland. A few honeysuckles were already noted at the edges of this wetland.

The marsh at Hoyt's Landing was not thoroughly inventoried. It is transitional between the alluvial shrub swamp upstream and the cattail marsh downstream, and has a relatively high cover of graminoids.

Each of these marshes is an individual occurrence, ranked D and C, respectively.

### **Spruce-Fir-Tamarack Swamp – S3**

On the ridge just east of the summit of Mount Ascutney is a very small (less than 1/10<sup>th</sup> acre) wetland that seems to be contained by a small bedrock basin. At least 2' of muck over rock could be found below a nearly continuous cover of sphagnum mosses (*Sphagnum* spp.). No surface water was present, but the soil was saturated just below the surface. Tree cover is sparse (10-30%), with the tallest individuals reaching only 20-30'. Red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), heart-leaved paper birch (*Betula papyrifera* var. *cordifolia*), and American mountain ash (*Sorbus americana*) are the only tree species present. Shrubs are absent, except for a few sapling and seedling trees. Herb cover (50-60%) includes fringed sedge (*Carex crinita*) and woolgrass (*Scirpus cyperinus*) as the most abundant species, followed by three-seeded sedge (*Carex trisperma*) and cinnamon fern (*Osmunda cinnamomea*). Additional species present are Canada mayflower (*Maianthemum canadense*), mountain woodfern (*Dryopteris campyloptera*), and New York fern (*Thelypteris noveboracensis*). It is possible that other swamps similar to this

one exist within the montane spruce-fir forest (or other high-elevation communities) but were not detected in this inventory due to their small size.

This single occurrence is C-ranked in part for its small size, and because a popular hiking trail travels directly through this swamp.

#### **Temperate Acidic Cliff – S4**

A large complex of cliffs and outcrops occurs on the southwest face of Little Ascutney Mountain, a portion of which is on lands with a state-owned easement. Discontinuous cliffs are interrupted by broad shelves. Due to their rock type and exposure, these cliffs are hot and dry, and vegetation is overall very sparse. At the same time, the harsh conditions can support species that are infrequently seen elsewhere in Vermont, such as the stunted and twisted red cedars (*Juniperus virginiana*) that grow from cracks in the rock. Scrubby red oak (*Quercus rubra*) is also present, though less abundant than the cedar. Woodland sedge (*Carex pensylvanica*) dominates on ledges; other herb species include pale corydalis (*Corydalis sempervirens*), poverty grass (*Danthonia spicata*), rusty woodsia (*Woodsia ilvensis*), intermediate pinweed (*Lechea intermedia*), and early low blueberry (*Vaccinium angustifolium*).

These cliffs and the associated shelves provide habitat for many wildlife species, including ravens. Uncommon species that have historically been found on and around the cliffs in this region include the timber rattlesnake and peregrine falcon.

In mapping this complex, the average slope (determined using USGS topographic maps) was used to distinguish areas of cliff from outcrop, and it is to be expected that steep cliffs may occur within a polygon mapped as outcrop, and that flat ledges or gentle slopes may occur within a polygon mapped as cliff. This is the only temperate acidic cliff identified in the AMU. This B-ranked occurrence covers 2.5 acres, and is considered a state-significant example of this community type.

#### **Temperate Acidic Outcrop – S4**

Ten patches of temperate acidic outcrops were mapped in the AMU, making six occurrences (all B-ranked) covering 13 acres; five of these occurrences are state-significant. These outcrops occur at middle elevations where bedrock is exposed; in this management unit they all are found on the igneous intrusive rocks syenite and granite. In some places, a thin layer of coarse shallow soil overlays the rock (never more than 50% soil cover, though). Stunted red oak (*Quercus rubra*) and white pine (*Pinus strobus*) reach heights of 30-40' at most. On Mount Ascutney, red pine (*Pinus resinosa*) is also a part of this community, while at Little Ascutney WMA, red cedar (*Juniperus virginiana*) is present. Tree cover is around 20-30% at most. Shrubs are generally absent, though striped maple (*Acer pensylvanicum*) and an *Amelanchier* species were noted in places. Herb cover is limited (30-40% at most) and includes sedges (*Carex* spp.), poverty grass (*Danthonia spicata*), wild sarsaparilla (*Aralia nudicaulis*), and bristly sarsaparilla (*Aralia hispida*). Moss and lichens make up about 10% of the groundcover. Two uncommon wildlife

species have historically been found on and around outcrops and cliffs in this region: the timber rattlesnake and peregrine falcon.

At Little Ascutney WMA, the average slope of the terrain (estimated from USGS topographic maps) was used to distinguish areas of outcrop from cliff in this mapping effort. There may be short steep cliffs among these outcrops that were too small to effectively map as separate communities.

An intriguing vegetation association was noted as part of the temperate acidic outcrops in Mt. Ascutney State Park. In some sections of these patches, there is a woodland (50-70% cover) with taller (50') trees that are a mix of red oak, white pine, hemlock (*Tsuga canadensis*) and red spruce (*Picea rubens*). Graminoids, blueberries (*Vaccinium* spp.) and Canada mayflower (*Maianthemum canadense*) make up the low shrub and herb layer. Both temperate acidic outcrops in Mt. Ascutney State Park have this vegetation mix (though not covering the whole patch) and similar sites were noted in the West Windsor Town Forest adjacent to the state land. This association does not fit well into the existing natural community classification system, and future inventory efforts in the AMU might seek to better describe and classify this association.

### **Temperate Calcareous Cliff – S3**

One B-ranked occurrence (seven acres) of this community occurs on the east side of Skitchewaugh WMA, where a broken band of cliffs and talus runs almost the entire north-south length of the WMA. Much of this cliff band is visible from Route 5. The bedrock is mapped as the Clough Formation and described as a quartzite-conglomerate with lenses of calcareous quartzite, and the nearby Fitch Formation is described as including layers of calcareous limestone and dolomite. Elements of both formations appear in this community, as the cliff includes large quartzite faces as well as faces of heavily-fractured calcareous rock.

Vegetation is very sparse on the cliff faces, and varies with the richness of the rock. Common species on non-calcareous surfaces include marginal woodfern (*Dryopteris marginalis*), Virginia creeper (*Parthenocissus quinquefolia*), and common polypody (*Polypody virginianum*). On calcareous surfaces maidenhair spleenwort (*Asplenium trichomanes*), blue-stemmed goldenrod (*Solidago caesia*), harebell (*Campanula rotundifolia*), and poison ivy (*Toxicodendron radicans*) are common. Three rare plants are known to occur at this site: early blue violet (*Viola palmata*), small-flower bittercress (*Cardamine parviflora*), and blunt-leaved woodsia (*Woodsia obtusa*). Due to the inaccessibility of some of the cliff faces, it is possible that other uncommon plants may occur but have yet to be identified. There are no trails or gear (i.e. bolts or abandoned anchors) that would indicate use of these cliffs by rock climbers—the soft crumbly rock and difficult access from Route 5 make Skitchewaugh Mountain unlikely to become a climbing destination.

These cliffs are suitable habitat for two uncommon wildlife species that have historically been found on and around cliffs in this region: timber rattlesnake and peregrine falcon.

Because the cliff band is discontinuous, this polygon includes small areas of Transition Hardwoods Talus Woodland, and steep Temperate Hemlock Forest. Most notable about these areas is that they have at least one pole-sized, fruiting American chestnut (*Castanea dentata*). This species seldom reaches maturity because of the exotic fungus that causes chestnut blight, so a reproductive individual is rather unusual. Although this species does not have a rarity rank or legal status in Vermont, efforts to protect and monitor apparently healthy individuals of this species could help the long-term viability of American chestnut in Vermont's forests.

This occurrence is considered a state-significant example of this uncommon natural community type.

### **Transition Hardwood Talus Woodland – S3**

This community is found on the talus that forms below cliffs on Little Ascutney Mountain and Skitchewaog Mountain. The example at Skitchewaog WMA is very closely related to the temperate calcareous cliff. Transition hardwood talus woodland is also mapped on a very steep slope within Little Ascutney WMA that has developed talus even though no cliff is found at the top of the slope. These two occurrences total 27 acres. One is B-ranked and considered a state-significant example; the other is C-ranked.

Although the rock type is not for the most part calcareous, this community has signs of enrichment—possibly from the downslope movement of soil with the talus. At Skitchewaog WMA, the rock type is mapped as quartzite, but it clearly has calcareous qualities. The vegetation is quite variable, ranging from areas of thick tree cover to areas vegetated with only low shrubs and herbs. Species in these talus woodlands patches include the tree species basswood (*Tilia americana*), white ash (*Fraxinus americana*), hophornbeam (*Ostrya virginiana*), red oak (*Quercus rubra*), hackberry (*Celtis occidentalis*) and birches (*Betula* spp.). Early low blueberry (*Vaccinium angustifolium*) and *Rubus* species are abundant shrubs. The vines poison ivy (*Toxicodendron radicans*) and Virginia creeper (*Parthenocissus quinquefolia*) are also abundant, along with the herbs marginal woodfern (*Dryopteris marginalis*), common polypody (*Polypody virginiana*) maidenhair spleenwort (*Asplenium trichomanes*), wild sarsaparilla (*Aralia nudicaulis*), broadleaf sedge (*Carex platyphylla*), and several goldenrod and aster species (*Solidago* spp. and *Aster* spp.).

The timber rattlesnake, a state-endangered species in Vermont, is presumed extirpated from the Southern Vermont Piedmont biophysical region. These rocky woodland habitats would, however, be suitable habitat for this species. Other snake species like the common garter snake still use this community, along with small mammals.

### **Vernal Pool – S4**

Vernal pools are small basins (without an inlet or an outlet) that collect and hold surface water during wet times—primarily spring—and dry up during other times of the year. Because they are temporary and isolated from other water bodies, these pools make excellent breeding habitat for

many amphibians whose eggs might otherwise fall prey to fish. Wood frogs, spring peepers, spotted salamanders, Jefferson's salamanders, blue-spotted salamanders and the red-spotted newts are all known to use vernal pools (Thompson and Sorenson 2000). Many invertebrate animals, such as fairy shrimp and fingernail clams, also use vernal pools. Ducks and herons are often attracted to larger vernal pools to prey on amphibians and invertebrates.

Two vernal pools are known from the AMU. One vernal pool (300' x 80') was identified at Wilgus State Park, and another pool (90' x 30') at Skitchewaug WMA. Vernal pools typically have a ring of wetland vegetation around the edge, often including sensitive fern (*Onoclea sensibilis*), marsh fern (*Thelypteris palustris*), rice cutgrass (*Leersia oryzoides*), and northern bugleweed (*Lycopus uniflorus*). Detailed vegetation data was not collected at either of these pools during this inventory; however, the state-endangered sharp manna-grass (*Glyceria acutiflora*) is known to occur at the vernal pool at Skitchewaug WMA. The pools are also influenced by the surrounding forest type, because leaf litter-fall and canopy shading can affect the ecological processes of vernal pools. The Wilgus State Park pool occurs within Mesic Red Oak-Northern Hardwood Forest, and the Skitchewaug WMA pool occurs within Temperate Hemlock Forest. Both pools are ringed by a full canopy shading the pool.

Vernal pools need to be assessed during the amphibian breeding season (spring and early summer) to properly determine a quality rank and if they are state significant. Given the known condition, landscape context, and size of these pools, however, it is likely that they will qualify as state-significant examples.

It is likely that other, probably smaller, vernal pools are scattered throughout the AMU. As these are discovered, they can be added to the natural community map.

### **White Pine-Red Oak-Black Oak Forest – S2**

Three occurrences (totaling 143 acres) of this uncommon community were mapped in the AMU. All are successional forests that likely have a long history of human disturbance. Thus, the possible presence of white pine-red oak-black oak forest is inferred primarily from the soils and the topography, not the vegetation. (Black oak (*Quercus velutina*) was not observed at any of these three patches.) Because of these factors, these occurrences are C and D-ranked. The two C-ranked occurrences (Mt. Ascutney State Park, Wilgus State Park) are considered state significant.

The largest patch of this community is mapped in Mt. Ascutney State Park, on the east side of Route 44A. Soils are mapped primarily as Windsor loamy fine sands, a deep (>60") soil of glaciofluvial origin. Currently, tall (up to 100') old field white pine (*Pinus strobus*) covers much of this area, with hemlock (*Tsuga canadensis*), white birch (*Betula papyrifera*), black birch (*Betula lenta*), beech (*Fagus grandifolia*) and red oak (*Quercus rubra*) present in a secondary canopy (60% cover). Shrub cover includes beech, red maple (*Acer rubrum*) and striped maple (*Acer pensylvanicum*). Hay-scented fern (*Dennstaedtia punctilobula*) is very abundant in the herb layer (average 60-70% cover) though a mix of other common woodland herbs is also present. A patch at Wilgus State Park is dominated by white pine with an understory of black

birch poles. Field sampling found very dry, coarse-sandy soils to a sample depth of three feet. The third patch of white pine-red oak-black oak forest is mapped on just 1.5 acres in the Hoyt's Landing Access Area. This area is on Ninigret fine sandy loam, and is only partially forested. It was not visited during this inventory, so current species composition is unknown.

Fully expressed white pine-red oak-black oak forests are thought to have a canopy of the three namesake species, though many other species are sometimes present. Tall shrubs include witch hazel (*Hamamelis virginianus*), and low shrubs include heath species like blueberries (*Vaccinium* spp.). Herbs include bracken fern (*Pteridium aquilinum*) and woodland sedge (*Carex pensylvanica*). White-tailed deer, turkey, grey squirrels, and other animals likely use this forest for the abundant acorn mast produced in the fall.

## **Fine Filter Assessment**

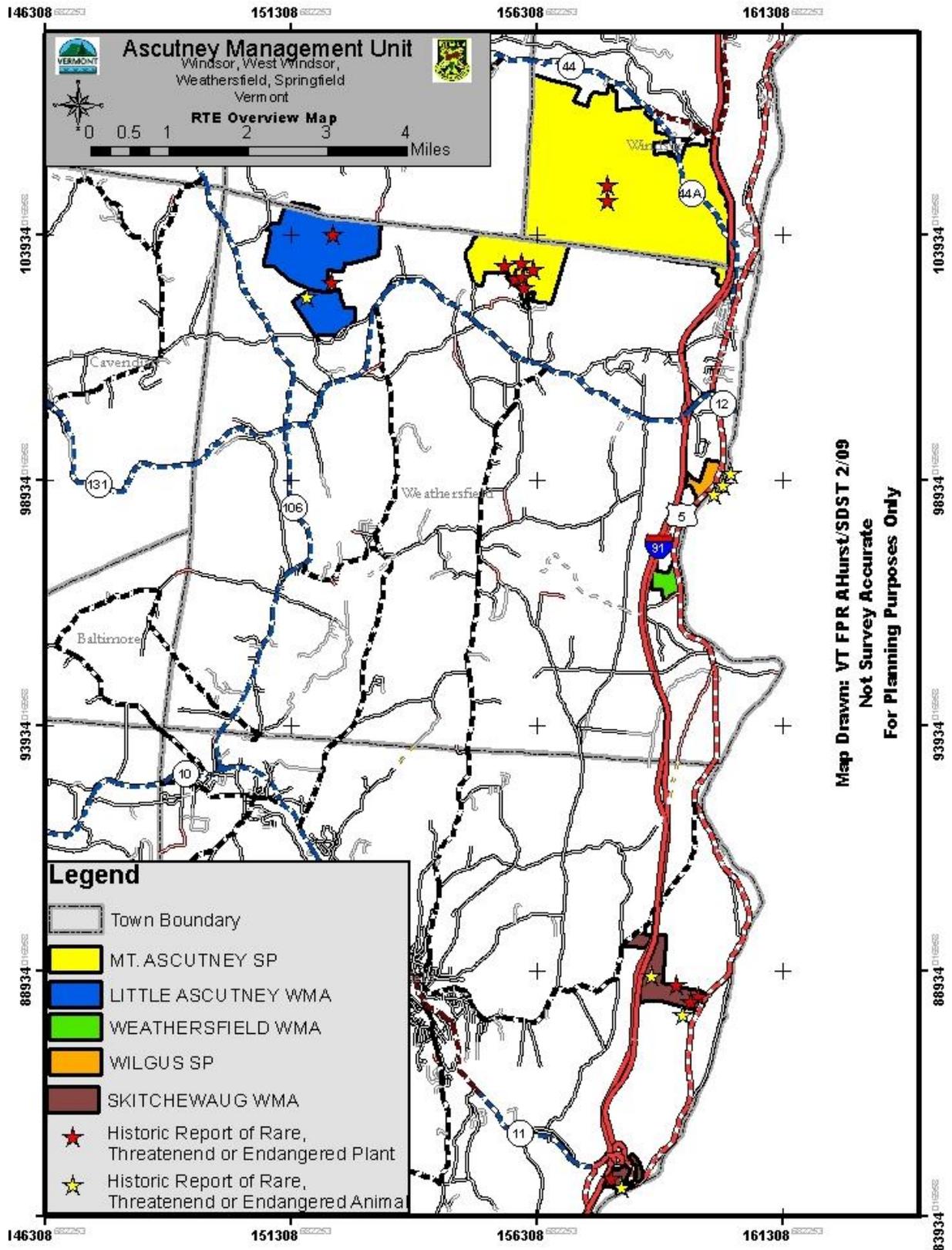
### Rare, Threatened, and Endangered Species

The Ascutney Management Unit is home to a number of rare, threatened, and endangered species of animals and plants. The species and their management needs are summarized below.

#### PLANTS

Seven species of rare or very rare plants have been located within the AMU (Table 3). Three of these are listed as “endangered” by Vermont state endangered species statute (10 V.S.A. 123). Their occurrence at AMU is thus very important on a statewide basis. Four plants that are uncommon in the state were also found. These plants are summarized in Table 3. Another of Vermont’s rare plants, the federally-endangered barbed-bristle bulrush (*Scirpus ancistrochaetus*), may also occur on within the AMU, most likely at Skitchewaugh WMA, where a known population is only 500’ outside of the WMA. This bulrush, which grows in swamps and marshes, is globally uncommon (G3), and is ranked S2 and listed endangered in Vermont. Land managers should be familiar with the plant, and look for it in swamp and marsh habitat in the AMU.

Figure 1: Rare, Threatened, and Endangered Overview Map



**Table 3: Rare, Threatened, and Endangered Plants of the Ascutney MU**

Species Name	Common Name	Sites Where Found	State Rarity Rank	Rarity*	State Legal Status
<i>Carex foenea</i>	Bronze sedge	Mt. Ascutney SP	S2	rare	endangered
<i>Carex siccata</i>	Hay sedge	Little Ascutney WMA	S1	very rare	endangered
<i>Glyceria acutiflora</i>	Sharp manna-grass	Skitchewaug WMA	S1	very rare	endangered
<i>Cardamine parviflora var. arenicola</i>	Small-flower bitter-cress	Skitchewaug WMA	S2	rare	
<i>Carex argyrantha</i>	Hay sedge	Mt. Ascutney SP; Skitchewaug WMA	S2	rare	
<i>Chimaphila maculate</i>	Spotted wintergreen	Mt. Ascutney SP	S2	rare	
<i>Viola palmata</i>	Early blue violet	Skitchewaug WMA	S2	rare	
<i>Carex backii</i>	Back's sedge	Little Ascutney WMA; Mt. Ascutney SP; Skitchewaug WMA	S3	uncommon	
<i>Nyssa sylvatica</i>	Black gum	Skitchewaug WMA	S3	uncommon	
<i>Poa saltuensis</i> <i>spp. Saltuensis</i>	Drooping bluegrass	Mt. Ascutney SP	S3	uncommon	
<i>Woodsia obtusa</i>	Blunt leaved woodsia	Skitchewaug WMA	S3	uncommon	

\*for an explanation of these rarity ranks, visit the Vermont Nongame and Natural Heritage Program's website: [http://www.vtfishandwildlife.com/wildlife\\_nongame.cfm](http://www.vtfishandwildlife.com/wildlife_nongame.cfm) or Glossary on page 128.

## ANIMALS

Several rare, threatened, and endangered species are found or predicted on or near parcels of AMU including:

*Dwarf Wedge Mussels* – A known population in the Connecticut River near the south end of Wilgus State Park.

*Hairy-tailed Mole* – Tunnels of this somewhat uncommon species were abundant at Wilgus State Park within the rivershore Grassland Community in a field survey in 2008.

*Long-tailed Shrew and Rock Vole* – Talus woodlands found at Mt. Ascutney State Park, Little Ascutney WMA, and Skitchewaugh WMA provide suitable habitat, but none were found in 2008 survey.

*Peregrine Falcon* – Historical records of peregrine falcon nesting sites on cliff face on or adjacent to the Little Ascutney WMA. No contemporary sightings. Peregrine falcons are documented and monitored nesting on a cliff face adjacent to Skitchewaugh WMA above Route 5.

*Pine Vole* – One specimen of this uncommon species was captured at Skitchewaugh WMA in a hemlock stand in the 2008 survey.

*Puritan Tiger Beetle* – Historical records of this species from shorelines along this portion of the Connecticut River. Of 11 known historic sites along the Connecticut, only two remain, none in Vermont (Silvio Conte Refuge report).

*Timber Rattle Snake* – Historical records from sites near Skitchewaugh WMA and Little Ascutney WMA with similar features. No sightings since the 1950s.

#### Non-Native Species

A number of non-native plant species were found in the AMU. Most are not a threat to native vegetation, habitats or wildlife; however, there are a few notable exceptions. Glossy buckthorn (*Rhamnus cathartica*), Morrow's honeysuckle (*Lonicera morrowii*), Japanese barberry (*Berberis thunbergii*), European barberry (*Berberis communis*) are all discussed previously as weeds in the understory of some of the forests of the AMU. These shrubs are particularly common on both sides of Route 44A in Mt. Ascutney State Park, and that latter two species are abundant in Skitchewaugh WMA and the wetland parcel of Hoyt's Landing Access Area. These species have also been found in many other areas. Another shrub capable of forming dense thickets and excluding native plants, winged burning bush (*Euonymus alatus*) was identified at the Hoyt's Landing wetland parcel. This invasive species is currently uncommon in Vermont, but is more widespread to the south. Timber harvest and other canopy gap producing activities can allow all of these aggressive shrubs to spread to the interior of forests. Consequently, forest management activities need to address means of controlling the plants.

Reed canary grass (*Phalaris arundinacea*) and common reed (*Phragmites australis*) are grasses that can invade mesic to wet areas and displace native species. Reed canary grass is especially abundant along the shoreline of the Connecticut River in Wilgus State Park, and common reed is poised to invade a wetland in Skitchewaugh WMA. (There is a native strain of *Phragmites australis*, but all of the individuals seen in this inventory appeared to be the non-native and invasive strain.)

Hemlock wooly adelgid is a non-native species that is decimating eastern hemlock in other parts of the northeast, and has recently turned up in Vermont, with one population as close as

Brattleboro. The animal has not been found on hemlock trees in the AMU, but it should be monitored for. A serious infestation of the adelgid could alter many of the natural resource values described previously.

### Core Forest

Core forest is a biological term that simply refers to any forested areas that are greater than 100 meters from a non-forested opening. While edge and transition habitat can be habitat for some native plant and animal species, edges can also negatively impact forest resources. An increase in invasive species, increased predation on many native songbirds, and a decrease in wildlife that prefers to use large blocks of intact forest are all associated with an increase in forest edge. Additionally, unbroken forest allows for easy dispersal of plants and animals, without large barriers to this movement. The AMU is located in a rural landscape that is in places highly fragmented by residential development and agriculture. Within this landscape, however, most of Mt. Ascutney State Park and Little Ascutney WMA (and the West Windsor Town Forest parcel that connects them) is part of a nearly 7000 acre block of core forest. This block is one of the largest core forest blocks in the Southern Vermont Piedmont biophysical region, and as such it provides important habitat in the region for wildlife species that avoid forest edges. Much of Skitchewaug WMA is part of a smaller block of core forest (approx. 1000 acres) that runs north-south along the length of Skitchewaug Mountain. This block reaches nearly to the northern tip of the wetland parcel of Hoyt's Landing Access Area, but does not include the open shrublands and marsh of that parcel.

### Wildlife Movement Corridors

Connections between wild lands can serve an important role in maintaining the long-term health and viability of wildlife populations. Wildlife corridors not only allow individual animals (such as young individuals searching for new habitat) to move throughout the landscape, but also allow for the transfer of genetic information across the region. Even the occasional travel of a few individual animals between otherwise isolated populations can substantially increase the long-term viability of each, because the genetic diversity within each group is effectively increased.

Even small patches of forest that are not core forest can serve an important role by providing corridors for wildlife to travel between larger forest blocks. In particular, Wilgus State Park, Weathersfield WMA, and Skitchewaug WMA are all connected by forest that is sandwiched between Route 5 and I-91, and crossed only by a few east-west roads. This may be an important corridor for north-south wildlife movement, though the interstate and the Connecticut River probably create barriers for some species. Larger species seem to have no trouble reaching this area, though: moose tracks were seen in the wetland parcel of Hoyt's Landing Access Area, even though it is surrounded by the highway, the Connecticut River, Route 5, and residential and commercial development. Fish & Wildlife has documented a portion of Little Ascutney WMA and West Windsor Town Forest at the height of land on Kimball Farm Road as a bobcat travel corridor. It is likely used by many wildlife species moving from Ascutney Mountain and Little Ascutney WMA. Much of the area west of Little Ascutney WMA is forested, and several moderately large core forest blocks are close by. This may create a corridor for wildlife to travel between the relatively wild southern Green Mountains and the smaller forested areas of the Connecticut River Valley.

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Figure 2: Little Ascutey WMA Natural Communities Map

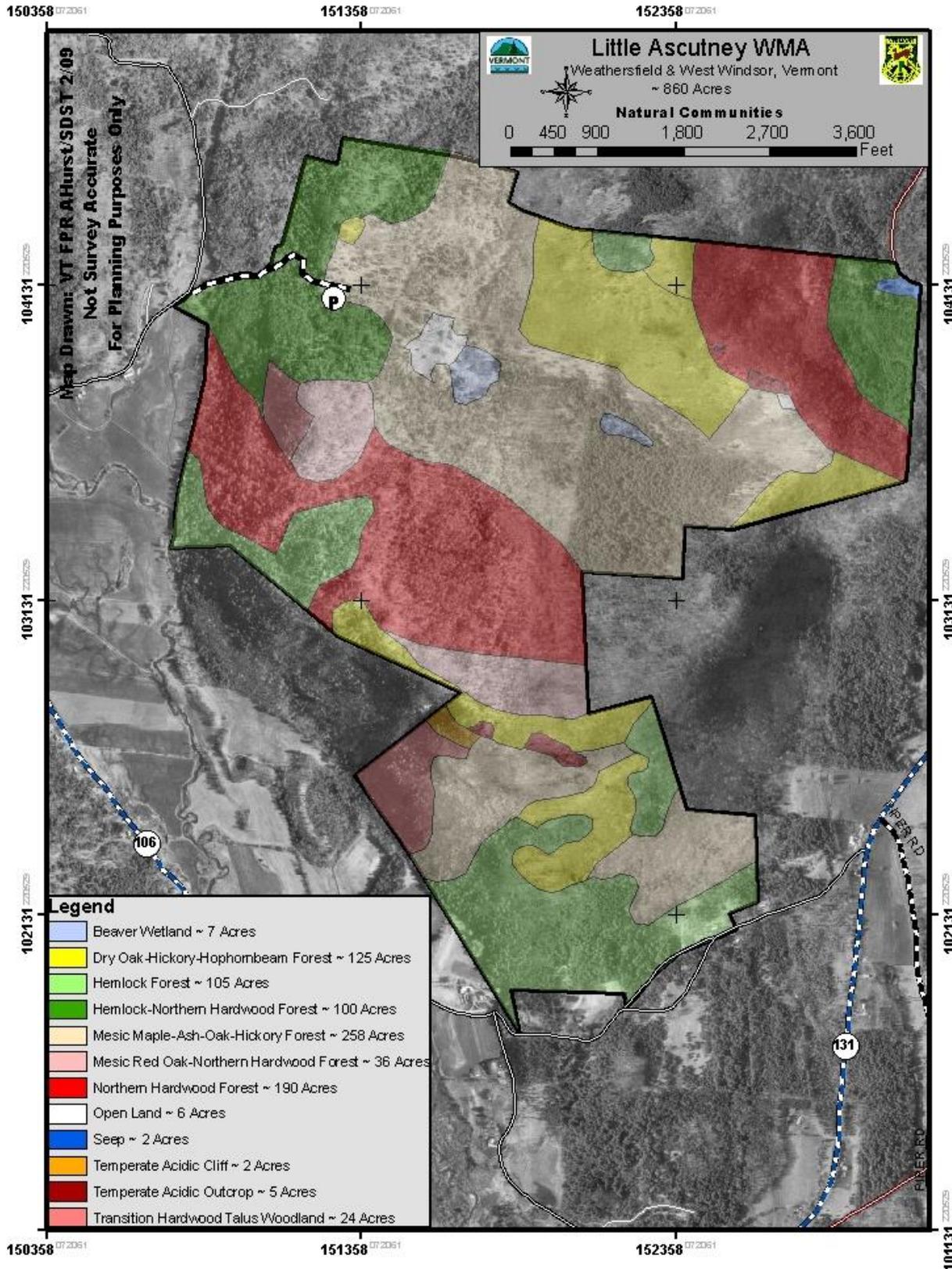




Figure 4: Skitchewaug WMA Mountain Block Natural Communities Map

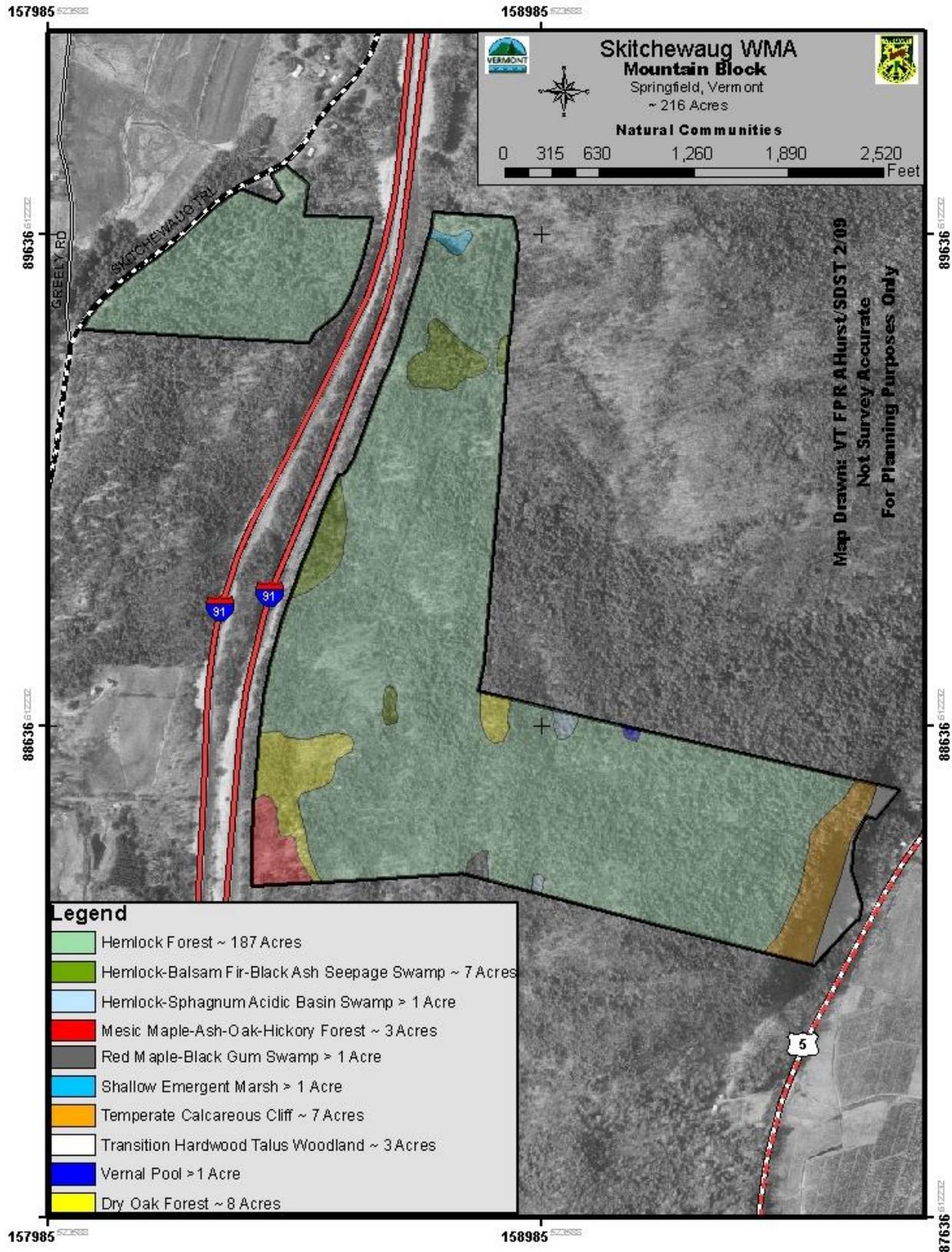


Figure 5: Skitchewaug WMA Spencer Brook Block Natural Communities Map

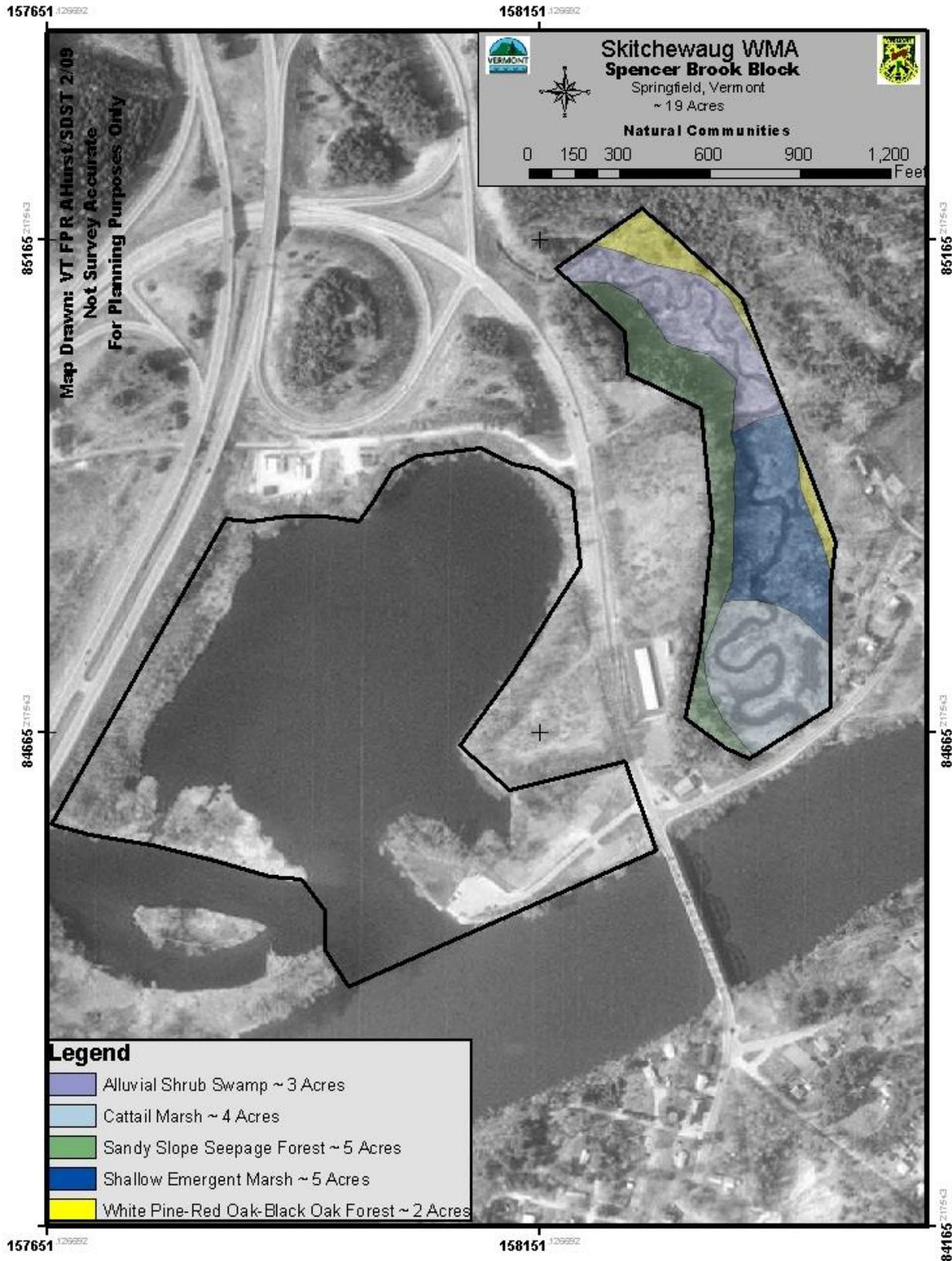


Figure 6: Weathersfield WMA Natural Communities Map

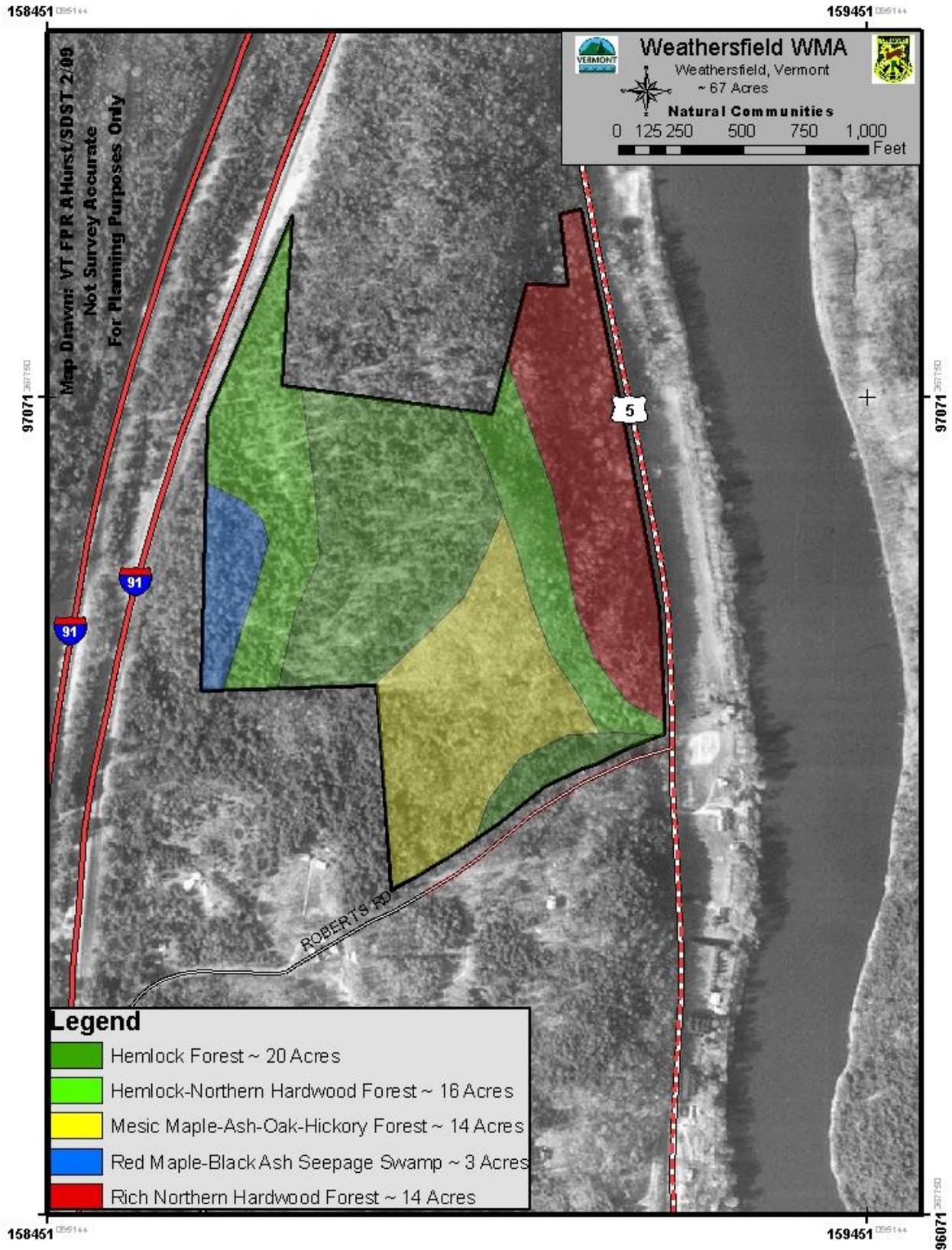
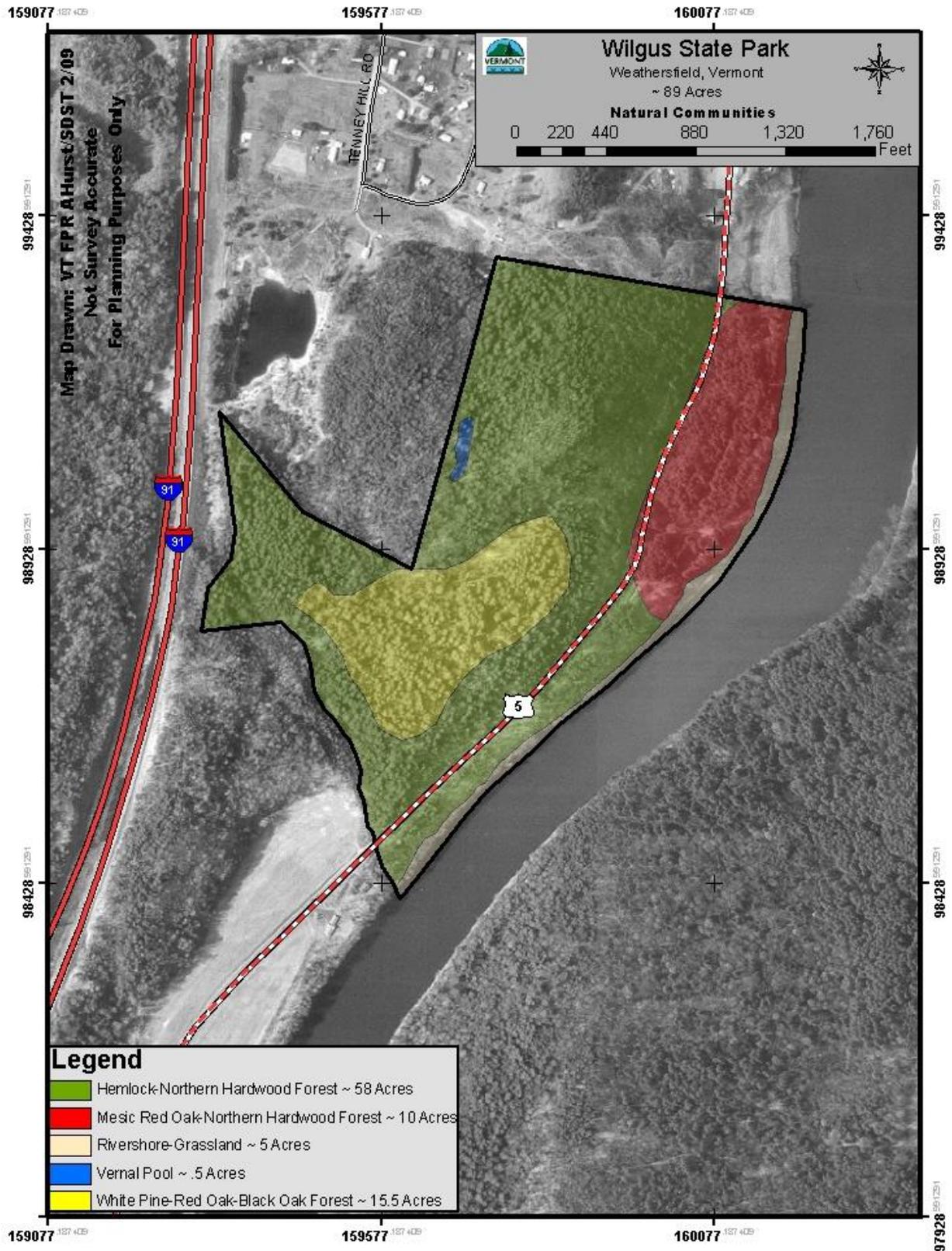


Figure 7: Wilgus State Park Natural Communities Map



## II. Wildlife and Wildlife Habitat Assessment with Maps

### 1. Amphibians and Reptiles

Amphibian and reptile surveys were conducted in 2006 and 2007 at Mt. Ascutney State Park, Little Ascutney WMA, and Skitchewaug WMA. Species captured or observed were as expected for the habitat present in most cases. No unusual or uncommon species were observed (Table 4).

**Table 4: Amphibian and reptile species observed on Ascutney Management Unit**

Species	Habitat (where observed)
Northern Dusky Salamander	Streams and wetlands
Eastern Red-backed Salamander	Woody debris, woodlands
Two-lined Salamander	Streambeds
Spring Salamander	Streambeds and marshes
Wood Frog	Woodlands, woodlands near water
American Toad	Woodlands, woodlands near water
Common Garter Snake	Sunny areas, open and wooded
Gray Tree Frog	Woodlands
Spring Peeper	Wetlands
Green Frog	Wetlands
Spotted Salamander	Woodlands
Eastern Newt	Woodlands and wetlands
Ring-necked Snake	Unknown
Milk Snake	Slate piles on Gurney lands

Several unique and/or rich habitats on the AMU could support a number of other less common species and, while not physically captured, are likely to be present (Table 5).

**Table 5: Amphibian and reptile species potentially found on Ascutney Management Unit**

Species	Typical Habitat
American Bullfrog	Beaver ponds
Pickerel Frog	Beaver ponds and adjacent wet meadows
DeKays Brownsnake	Wetlands and nearby rocky uplands
Smooth Greensnake	Fields and wetland meadows
Wood Turtle (S3 species)	Lower elevations of Little Ascutney WMA near North Branch

Two species with an S2 state rank and one with an S-1 state rank could exist on Little Ascutney WMA and/or Skitchewaug WMA based on the habitat present and historic records. The likelihood of their occurrence is unknown and speculative. They are:

Timber Rattlesnake	Talus slopes on/or near Skitchewaug WMA and Little Ascutney WMA
Four-toed Salamander	Vernal pools and open wetlands at Skitchewaug WMA
Jeffersonville Salamander	Vernal pools and nearby woodlands (site is likely too acidic for Jefferson Salamander)

Recommendations of Herpetologist Jim Andrews, principal investigator at Little Ascutney WMA and Skitchewaug WMA include:

- The current status of the Timber Rattlesnake at Skitchewaug WMA and Little Ascutney WMA is extirpated. However, favorable habitat still exists here. Additional surveys targeting talus slopes in May or September could determine if this species still exists at either of these locations. Should management for this snake and other common snakes be an objective, more extensive recommendations for habitat improvement are made in the full report.
- If wood turtles are using the small area of floodplain on the west side of Little Ascutney WMA, recommendations to protect the species include:
  - Acquisition of additional floodplain and adjacent uplands.
  - Changes in mowing practices of fields.
  - Seasonal restriction of recreational and commercial vehicles on trails in key areas.
  - Changing mowing patterns to push animals away from mowing and late season mowing in general.
  - Encouraging beaver presence to expand wetlands.
  - Not stocking pools at Little Ascutney WMA (there are no plans to do so).
  - Protect riparian areas from ground disturbance and excessive canopy openings.

## 2. Breeding Birds and Game Birds

Bird species presence and status on the AMU are summarized from three sources: Vermont Breeding Bird Atlas (VBBA), Vermont Forest Bird Monitoring Program (VFBMP), and a site-specific inventory of Skitchewaug WMA conducted in 2006. A more detailed assessment and a report of the Skitchewaug WMA are available.

Eleven species of “Greatest Conservation Need” (SGCN) are probable or confirmed breeders within the AMU: American Woodcock, Black-billed Cuckoo, Black-throated Blue Warbler, Canada Warbler, Chestnut-sided Warbler, Field Sparrow, Olive-sided Flycatcher, Peregrine Falcon, Ruffed Grouse, Veery, and Wood Thrush.

An important game species, the Wild Turkey, is a common and important species for hunters on Mt. Ascutney State Park and Little Ascutney WMA.

Bird habitat needs are as diverse as bird populations, but several important general recommendations and concerns apply to many species including:

- Forest fragmentation that increases brood parasitism and predation by edge species, such as blue jays and raccoons, has a negative impact on interior songbirds such as Veery, Wood Thrush, and Black-throated Blue Warbler.
- Enhancing shrub-sapling understories and vertical diversity is beneficial to a number of songbird species.
- Maintenance and creation of early successional habitat such as meadows and young forests benefit certain songbirds and three important game species: American Woodcock, Ruffed Grouse, and Wild Turkey.
- Riparian areas and water features, such as wetlands and seeps, are important habitat to many species of birds.

### 3. Small Mammals

A Small Mammal Assessment of several parcels on Ascutney Management Unit was conducted in 2009 by Northeastern Wildlife Genetics, Inc. as part of Vermont's small mammal atlas. Partial funding of the project through state wildlife grants allowed for detailed field surveys of Mt. Ascutney State Park, Little Ascutney WMA, Skitchewaung WMA, Weathersfield WMA, and Wilgus State Park.

The report executive summary states:

*Executive Summary* – A total of seventeen species of small mammals were documented to occur in the Ascutney Management Unit (Table 6 and 7). Thirteen species of small mammals were captured in surveys consisting of 1821 trap nights. Mice of the genus *Peromyscus* were the most abundant small mammal accounting for 92-95% of the mammals captured in some habitats. Deer mice (*Peromyscus maniculatus*) were captured in more mesic coniferous and hardwood forests where they accounted for an average of 48.7% of the captures. White-footed mice (*Peromyscus leucopus*) were found in oak and mixed forest at lower elevations and accounted for an average of 60.5% of the captures. Both species of *Peromyscus* appear to be at very high densities in the summer of 2009. Voles accounted for nearly 12% of the mammals captured, with meadow voles (*Microtus pennsylvanicus*) being the species most frequently captured (60.7%), although many habitats where they would be expected to be abundant were not surveyed. The red-backed vole (*Myodes gapperi*) was the second most abundant vole captured accounting for 47.6% of the voles captured but only accounting for 4.2% of the total captures. The low numbers of red-backed voles captured in the surveys of suitable habitat indicates that the density for this species was rather low at the time of the surveys. A single specimen of the rare pine vole (*Microtus pinetorum*) was captured from Skitchewaung WMA. Shrews accounted for 8.9% of the specimens

captured and included the three more commonly taken species in Vermont. In addition, sign of the hairy-tailed mole was common along the Connecticut River flood plain in Wilgus State Park. Jumping mice accounted for only 5.1% of the captures but both woodland and meadow jumping mice were captured. The high population densities of mice of the genus *Peromyscus* may well have impacted the population levels of other species, such as red-backed voles or woodland jumping mice, or may have biased the sampling of other mammals resulting in lowering their estimates of relative abundance. Three species of bats, including little brown bats (*Myotis lucifugus*), northern long-eared bats (*M. septentrionalis*) and big brown bats (*Eptesicus fuscus*), were detected in acoustical surveys conducted at five locations in the Ascutney Management Unit. Bat activity was found to be very low along 3 roads or trails surveyed, moderate along the Connecticut River, and high at the beaver wetland in Little Ascutney WMA.

**Table 6: Small mammals collected from Weathersfield WMA and Wilgus State Park in the fall of 2008**

Species	Wilgus State Park Sites			Weathersfield WMA Sites		Total
	A	B	C	A	B	
Insectivora - shrews						
<i>Blarina brevicauda</i>		1	1	4	1	7
<i>Sorex cinereus</i>				1		1
<i>Sorex fumeus</i>				1		1
Sciurids - squirrels						
<i>Tamias striatus</i>			4			4
<i>Glaucomys volans</i>	1					1
Microtines - voles						
<i>Myodes gapperi</i>				1	2	3
<i>Microtus pennsylvanicus</i>			1			1
Peromyscines – deer mice						
<i>Peromyscus leucopus</i>	2	7	4	6	8	27
Zapodids – jumping mice						
<i>Napeozapus insignis</i>				1	3	4
<b>Total</b>	<b>3</b>	<b>8</b>	<b>10</b>	<b>14</b>	<b>14</b>	<b>49</b>
<b>Trap success</b>	<b>3.3%</b>	<b>8.8%</b>	<b>8.4%</b>	<b>9.3%</b>	<b>9.3%</b>	<b>8.2%</b>

**Table 7: Small mammals collected from Mt. Ascutney State Park, Little Ascutney WMA and Skitchewaug WMA in the summer of 2009**

Species	Mt. Ascutney State Park Sites					Little Ascutney WMA Sites				Skitchewaug WMA Sites					Total
	A	B	C	D	E	A	B	C	D	A	B	C	D	E	
Insectivora - shrews															
<i>Blarina brevicauda</i>	1										2	1		1	5
<i>Sorex cinereus</i>		2		3											5
<i>Sorex fumeus</i>										1				1	2
Sciurids - squirrels															
<i>Tamiasciurus hudsonicus</i>											1				1
<i>Tamias striatus</i>			1								5		3		9
<i>Glaucomys volans</i>															
Microtines - voles															
<i>Myodes gapperi</i>	3				2		1						1		7
<i>Microtus pennsylvanicus</i>		1*						1	9				5		16
<i>Microtus pinetorum</i>											1				1
Peromyscines – deer mice															
<i>Peromyscus maniculatus</i>	1	2	13	4	4	9	4	1	3			3*			44
<i>Peromyscus leucopus</i>						4	3				24	24	10	23	88
Zapodids – jumping mice															
<i>Napeozapus insignis</i>			2	1											3
<i>Zapus hudsonius</i>									5						5
<b>Total</b>	<b>5</b>	<b>5</b>	<b>16</b>	<b>8</b>	<b>6</b>	<b>13</b>	<b>8</b>	<b>2</b>	<b>17</b>	<b>1</b>	<b>33</b>	<b>28</b>	<b>19</b>	<b>25</b>	<b>186</b>
<b>% Trap success**</b>	<b>6.7</b>	<b>16.7</b>	<b>20.0</b>	<b>16.7</b>	<b>9.1</b>	<b>16.7</b>	<b>19.8</b>	<b>6.7</b>	<b>18.3</b>	<b>3.3</b>	<b>45.0</b>	<b>31.1</b>	<b>34.5</b>	<b>10.3</b>	<b>18.2%</b>

\* tentative field identification awaiting DNA conformation

\*\* includes recapture of marked animals

A total of 17 species of small mammals including 3 species of bats and 14 species of small terrestrial mammals (including 3 species of shrews, 1 species of mole, 3 species of squirrels, 2 species of deer mice, 3 species of voles, and 2 species of jumping mice) were detected on the Ascutney Management Unit. This survey provided documentation of an additional natural population of the rare pine vole (*Microtus pinetorum*). Habitats associated with two other rare species, long-tailed shrews (*Sorex dispar*) and rock voles (*Microtus chrotorrhinus*) were identified and surveyed (Talus slopes); however, no populations of either species were detected. Populations of mice of the genus *Peromyscus* were at very high densities and additional survey should be considered for other species once the number of deer mice and white-footed mice have declined.

*All text and tables above from Ascutney Management Unit Small Mammal Report, C. William Kilpatrick, Ph.D., Northwoods Stewardship Center, East Charleston, Vermont, 2009.*

#### 4. Critical Habitats and Important Habitat Features

##### **Critical Habitats**

Critical habitats are features that are required for maintaining populations of certain species. These areas typically provide necessary cover or food at important times such as winter or breeding season. Key habitat features and associated acreage and location are found in Table 8.

**Table 8: Key habitat features of AMU (acres)**

	Little Ascutney WMA	Mt. Ascutney State Park	Skitchewaugh1 WMA	Skitchewaugh2 WMA	Weathersfield WMA	Wilgus State Park	Total
Apples	6	3	—	—	—	—	<b>9</b>
Cliff/Talus	2	6	7	—	—	—	<b>15</b>
Deer Wintering Area	137	395	174	—	—	—	<b>706</b>
Early successional & young stands (1-40 years)	32	<50	—	—	—	—	<b>&lt;82</b>
Hard Mast	352	720	23	2	14	60	<b>1,171</b>
Meadows & Openings	19	12	—	—	—	—	<b>31</b>
Mature Forest Stands (41 years and >)	789	3,059	199	—	84	80	<b>4,211</b>
Wetlands, Seeps & Vernal Pools	12	2	10	12	3	5.5	<b>44.5</b>

## **Deer Wintering Areas (DWA)**

Important winter deer cover is found on Mt. Ascutney State Park, Little Ascutney WMA, and Skitchewaugh WMA. The southern slopes of Mount Ascutney provide a regionally significant DWA as do southern and western slopes on Little Ascutney WMA. In general, these areas are functionally in good condition. Some of these areas are steep south slopes of hardwood as opposed to the more typical hemlock stands. The DWA on Ascutney is easily the most regionally significant on the AMU.

Conservation and improvement of DWAs has been and will continue to be a focus of management on ANR lands. Increased winter recreation on Mt. Ascutney could lead to conflicts between public use and the functioning of the DWA. Impacts to white-tailed deer in winter will be an important consideration of management and decisions of land use allocation.

## **Amphibian Breeding Sites**

More detail can be found on populations in the preceding herpetological assessment on reptile and amphibian habitat on Mt. Ascutney State Park, Little Ascutney WMA, and Skitchewaugh WMA. Breeding sites in the form of streams, wetlands, and vernal pools can be found on all parcels of the AMU. District guidelines to buffer and protect water features provide protection for breeding sites.

## **Riparian Areas**

Significant wetlands occur on Little Ascutney WMA, Skitchewaugh WMA, and Weathersfield WMA. All are important local wildlife habitats with no known threats to their occurrence. None are in conflict with access roads or harvesting trails, though ANR has limited control over road and trail placement of Weathersfield WMA. District riparian management guidelines should protect these areas sufficiently.

## **Important Habitats**

*Hard Mast Stands* – The seeds of oaks, hickory, and American beech are important wildlife food sources for game and non-game species. Significant hard mast stands are found on Mt. Ascutney State Park, Little Ascutney WMA, Skitchewaugh WMA, and Weathersfield WMA. The condition of these trees and stands is generally excellent except for American beech which continues to succumb to beech bark disease throughout the region. Management of hard mast trees has been a focus at Little Ascutney WMA with approximately 75 acres of crop tree release of oak and hickory in the last five years. Most mast stands on Mt. Ascutney State Park are on steep, unmanageable side hills as are a number of more mature mast stands on Little Ascutney WMA. A long-term threat to mast production is the heavy deer browsing that tends to occur on oak and hickory seedlings and prevents recruitment of new mast trees for the future. Browsing of oak and hickory seedlings on most of AMU ranges from heavy to severe.

*Soft Mast Trees and Shrubs* – Apples, fruit trees and shrubs, raspberries, and blackberries are important summer and fall food sources for many birds, insects, and mammals. Wild apple orchards are found on Mt. Ascutney State Park and Little Ascutney WMA and have seen

significant improvement through thinning. Serviceberry are somewhat common on portions of Little Ascutney WMA and many have been released from competition in the last several years. Less frequent mowing of fields has resulted in recruitment of dewberry – an important food source for field sparrows in several areas, notably Little Ascutney WMA.

Meadows are maintained for habitat on Mt. Ascutney State Park and Little Ascutney WMA. Fields that are mowed annually at Little Ascutney WMA provide the most abundant grasses. As budgets shrink and mowing becomes less frequent, more woody vegetation encroaches as does the risk of invasive exotic shrubs becoming established. Mowing is typically done late summer to protect field-nesting birds. Meadows at both parcels are also providing excellent reptile habitat though stone pile or woodpile type cover has been recommended.

*Cliff/Talus* – Cliff and talus sites are found at Mt. Ascutney State Park, Little Ascutney WMA, and Skitchewaugh WMA. They are important habitat features for common and uncommon animals and plants including bobcat, garter snake, milk snake, and porcupine.

Several historical or expected occurrences of rare, threatened, and endangered animals are reported for the AMU including peregrine falcon at Little Ascutney WMA and near Skitchewaugh WMA, timber rattlesnake near Skitchewaugh WMA, and long-tailed shrew and rock vole on talus slopes.

Talus and cliff sites are generally remote and unreachable for management purposes and so little conflict with forest management is expected. Recreational uses such as rock climbing could have negative impacts though currently there are no official climbing sites on the AMU. Ice climbing and occasional rock climbing are known to occur at Mt. Ascutney State Park. A recommendation to clear brush and trees of rock and ledge to improve snake habitat has been made, but budget and practicality make it unlikely this will occur.

*Rivershore* – Rivershore habitat is found at Wilgus State Park on the Connecticut River. The dwarf wedge mussel, on the federal endangered species list, occurs at the southern end of Wilgus. In 2000 as part of a canoe access stabilization project, several dwarf wedge mussels were found on the north end of the park and relocated. The rivershore is also potential habitat for the Puritan tiger beetle listed as state threatened. This shoreline also provides habitat for shore-feeding birds and furbearers such as river otter and mink.

The land above the shore is steep and eroded severely limiting human access and use. A historical boat access is found on the north end and a stairway and observation platform at the south end. Both have limited impact to the rivershore's use by wildlife. Long-term plans for Wilgus State Park include better river access for campers. While the stairway project is on hold for the near future, if completed, foot traffic along the river could increase.

## **Habitat Diversity**

The current variety of wildlife species found on AMU is reflective of the diverse and productive habitat found on most of the parcel (Table 8). In general, mast stands or individual trees of oak and hickory are abundant as are deer wintering areas and mature stands. Less well represented,

though equally important, are young forest stands, meadows, and shrubby openings. Below is a discussion of habitat diversity and management potential for wildlife by parcel:

#### *Little Ascutney WMA*

Habitat for game species is abundant and far superior to most Vermont woodlands. Managed meadows, apple orchards, oak stands, and a large deer wintering area provide habitat for many species. Early successional stands and openings comprise 69 acres or 8% of the total parcel. Mature stands comprise 789 acres or 92% of the total. Portions of the WMA are inaccessible and inoperable and will provide an older age class habitat feature into the future. A large wetland complex at the center of the parcel is a productive habitat feature for a wide variety of game and non-game species.

#### *Mt. Ascutney State Park*

The dominant habitat features of Mt. Ascutney State Park are large deer wintering areas, many acres of oak (and some hickory), mast stands, and several thousand acres of mature forest of uncommon natural communities inoperable for forest management. Less than 2% is early successional forest or openings, leading to intense browsing pressure of forest understories, particularly within or near deer wintering areas. Steep, inoperable slopes and heavy recreational use in the 800-1,000 acres considered operable for forestry will make it difficult, if not impossible, to change this situation.

#### *Skitchewaug WMA*

Key features of Skitchewaug WMA are several uncommon natural communities, numerous pockets of young oak trees, and some older individuals of unusual oak species and hickory, a 10-acre cliff and talus slope, several wetlands, and a large deer wintering area.

The main constraint to active management here are the numerous exotic shrubs on edges and surrounding lands and the lack of legal, usable access. However, within the heavily fragmented landscape it sits, it serves an important function of providing core habitat for a number of species, in particular white-tailed deer.

#### *Skitchewaug WMA (Spencer Brook Block)*

This block is primarily a wetland surrounded by road on three sides with a bank of oak and pine on the north side. Surrounded by roads and homes, there is little opportunity for active management.

#### *Weathersfield WMA*

Key habitat features on this small parcel are mast trees and a three-acre wetland that at one time supported a modest population of black ash (now dead). F&W does not control timber rights on the parcel so management by ANR is not possible.

## *Wilgus State Park*

Wilgus State Park features the only rivershore habitat on the AMU. It is a key habitat feature here and is frequently used by furbearers such as otter and mink. Oaks scattered throughout the parcel produce mast crops. An isolated vernal pool appears to be important amphibian habitat. It appears many years ago it was breached to provide water downslope, possible for gardeners. This breach needs to be repaired to enable the pool to hold water long enough for amphibian larvae to develop to adulthood.

Within the AMU, as a whole, the breakdown of habitat age classes and their respective acreages and proportions of AMU lands are as follows:

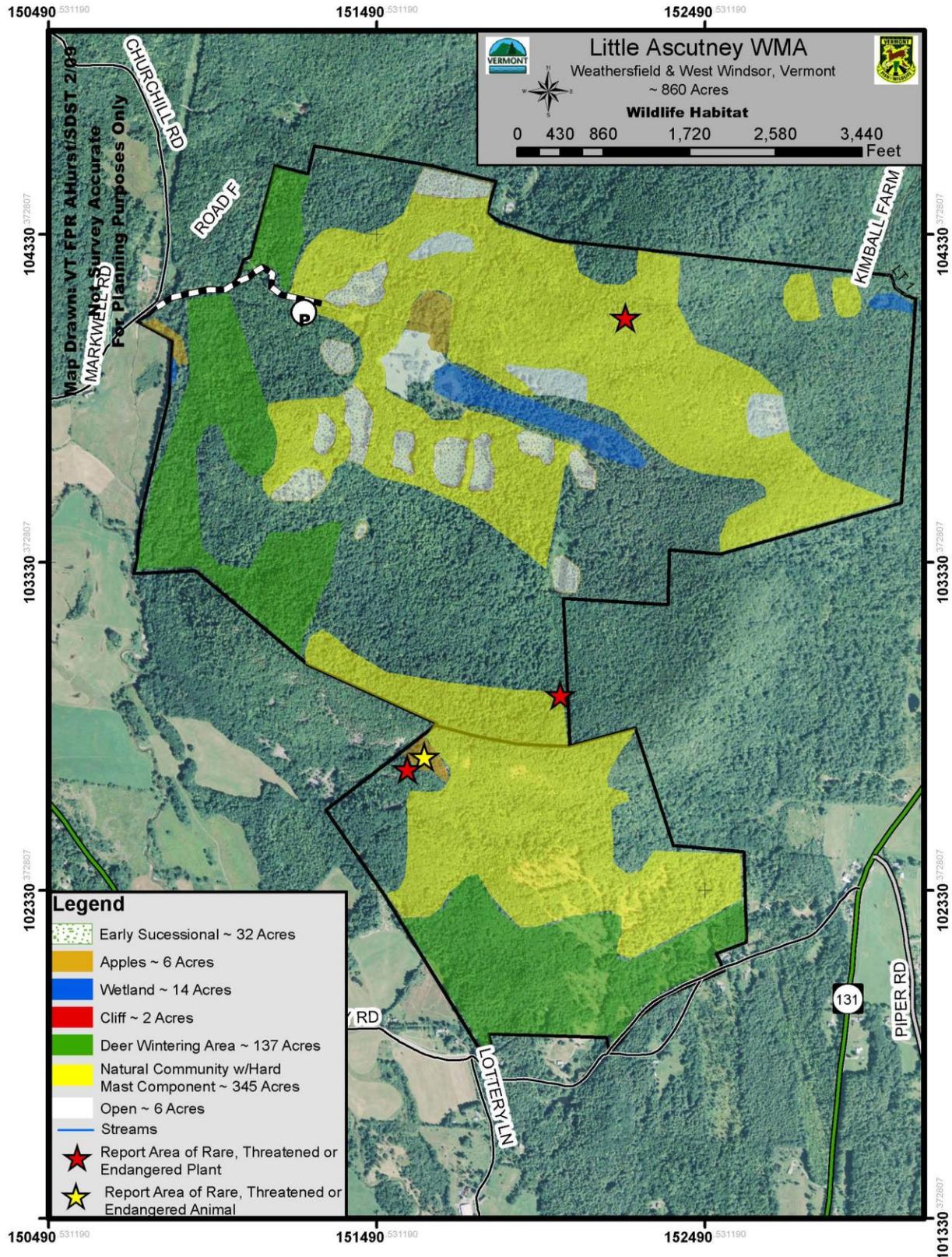
- Permanent openings
  - fields, landings, power corridor: 33 <1%
  - open wetlands: 7 <1%
- Shrubland
  - Wetland edges and cattail marsh: ~15 <1%
  - Shrub swamp: ~12 <1%
  - Wooded wetland: ~10 <1%
- Early successional forest\*
  - 1-40 years: 79 1.8%
- Mid and Late Successional forest land
  - 41+ years: 4337 97%

*\*Includes apple orchards*

These figures yield several important conclusions:

1. Permanent openings and wetlands, important habitat for many species, comprise a very small portion of the AMU. Maintaining openings, protecting wetlands, and co-existing with beavers will continue to be important habitat objectives.
2. The availability of early successional forest land is below ideal levels to support early successional wildlife species. In addition, approximately half of the early successional habitat on AMU is at a point in its development when it will no longer serve as early successional habitat. As referenced in the State of Vermont LRMP for Coolidge State Forest, “Data from pre-settlement estimates suggests that approximately 4% of the landscape should be in early successional habitat of the ages 1-15 years.” Management to create additional early successional forest is needed to benefit a number of species in decline due to a lack of early successional habitat, including Ruffed Grouse, Field Sparrows, Cottontail Rabbit, and the Eastern Towhee. Because a large percentage of the AMU is inoperable due to steep slopes with poor management access, deer wintering areas, or with the timber owned by a second party, reaching the 4% goal could be difficult though important.

Figure 8: Little Ascotney WMA Wildlife Habitat Map



**Figure 9: Mt. Ascutney State Park Wildlife Habitat Map**

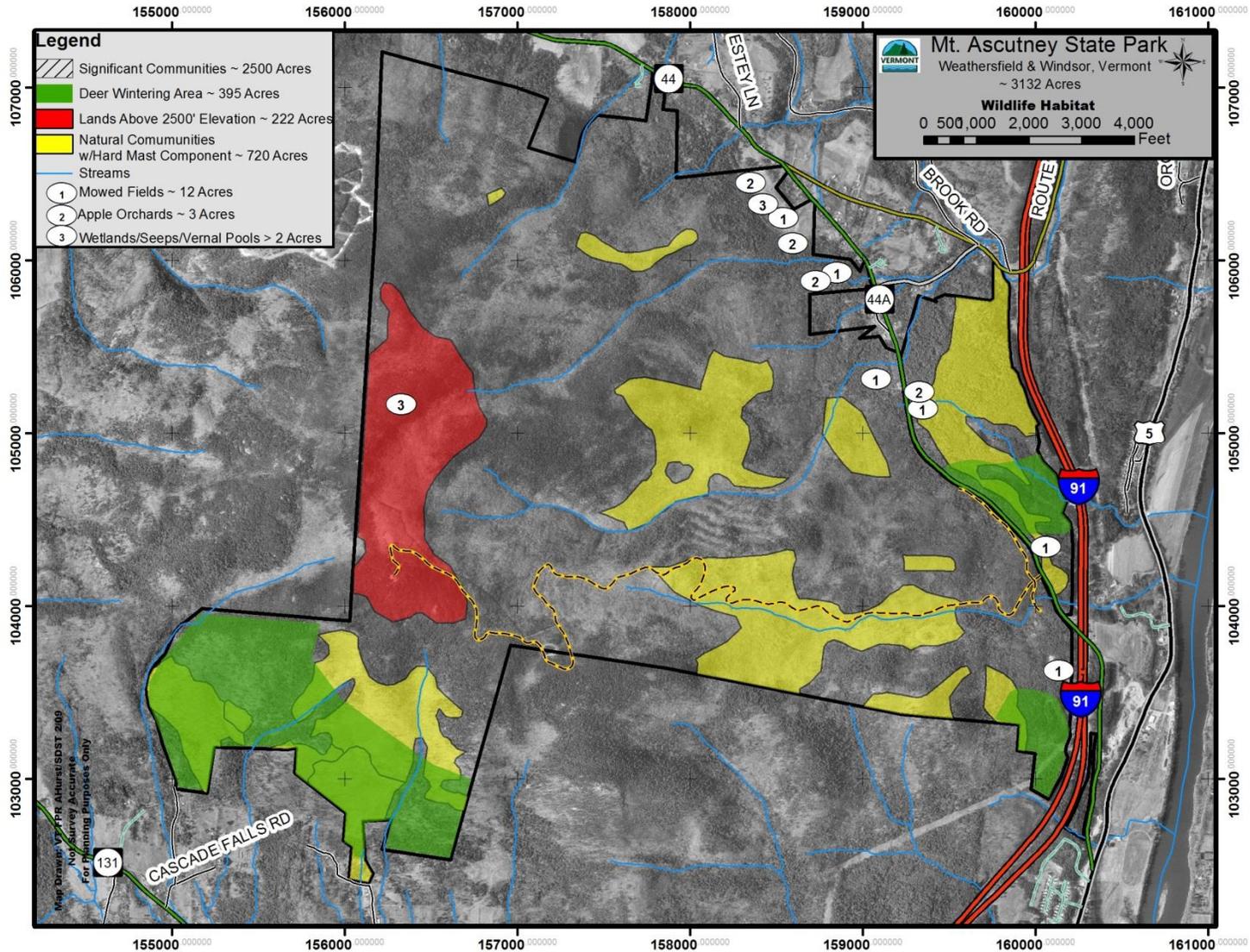


Figure 10: Skitchewaug WMA Mountain Block Wildlife Habitat Map

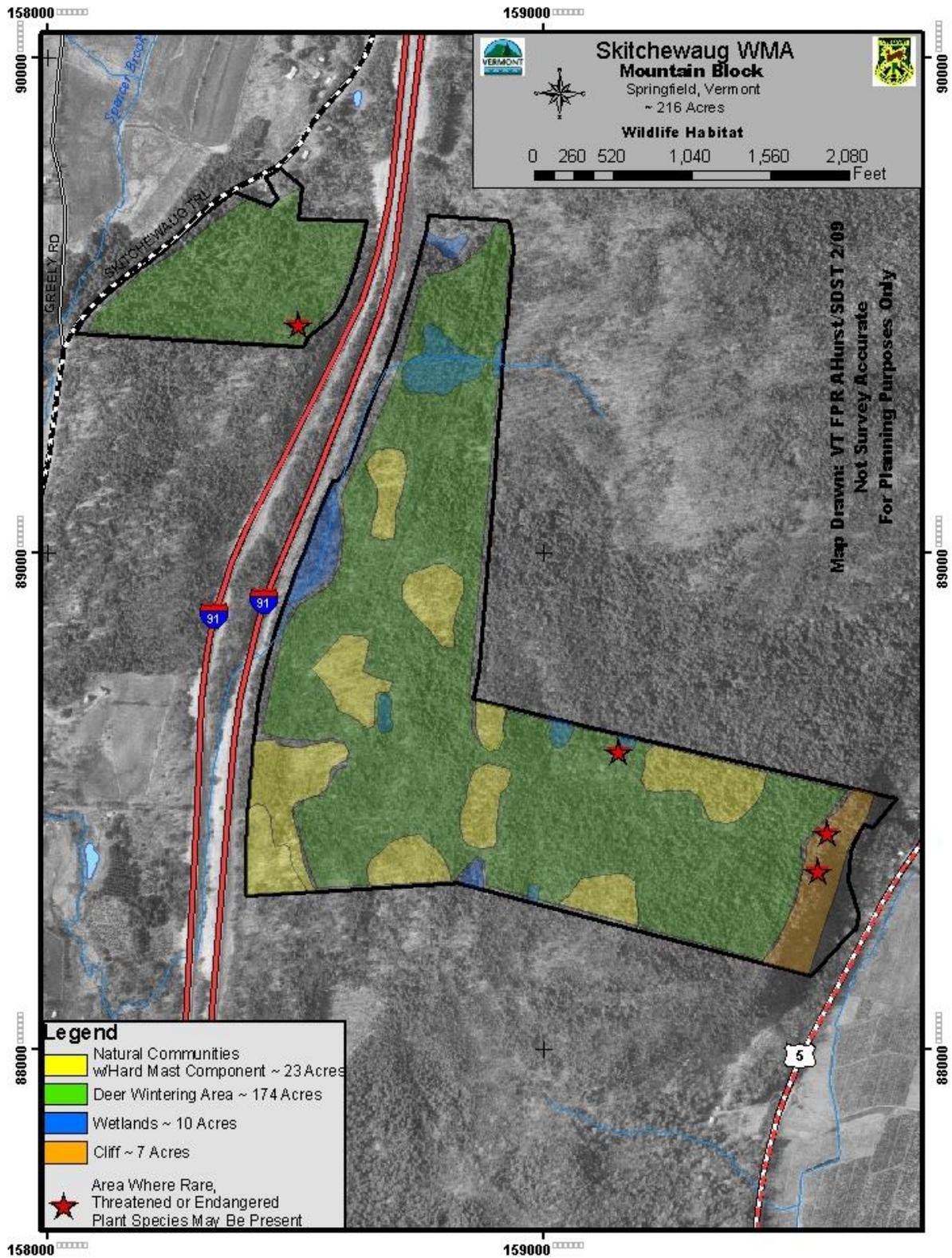


Figure 11: Skitchewaug WMA Spencer Brook Block Wildlife Habitat

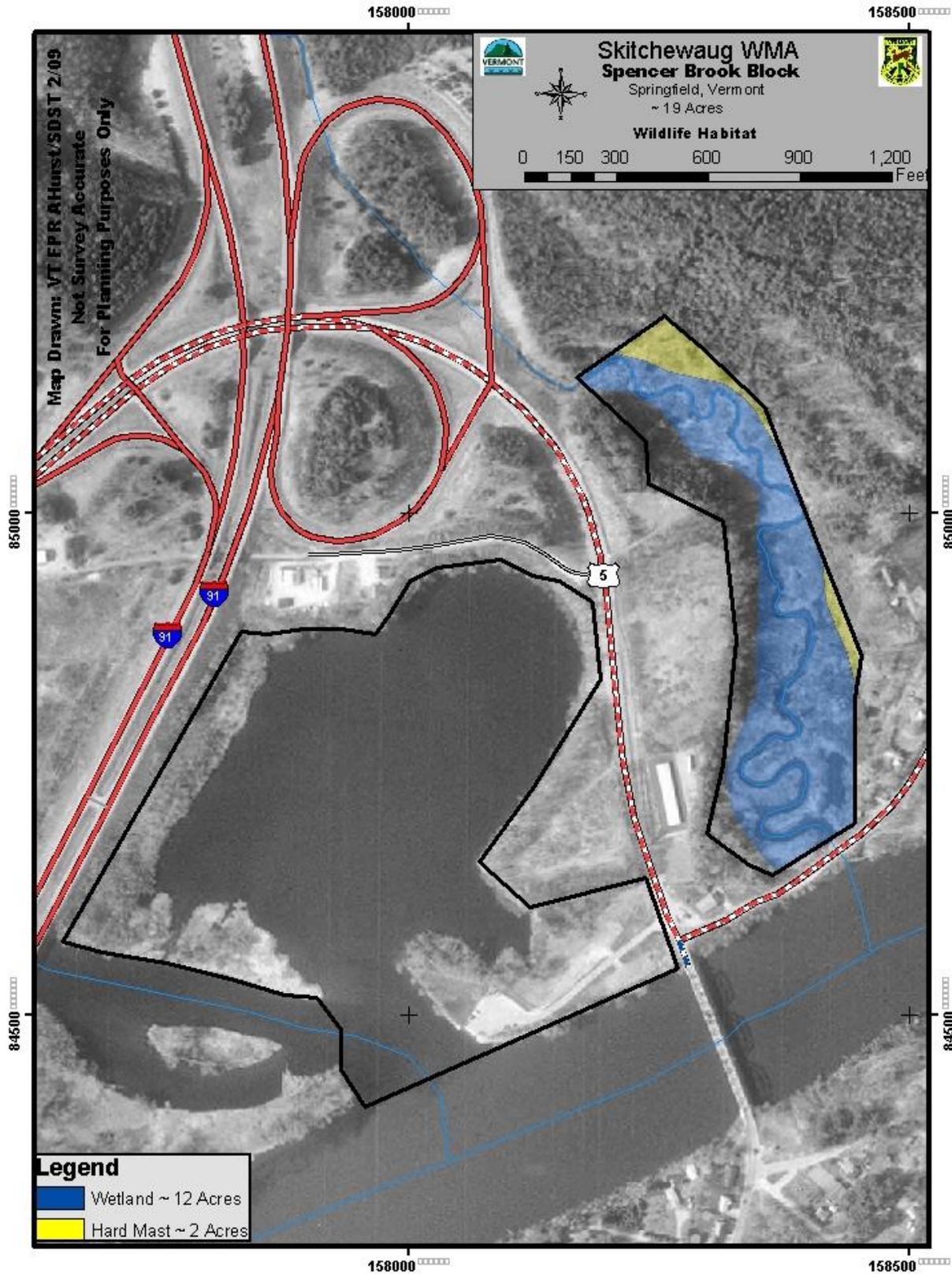
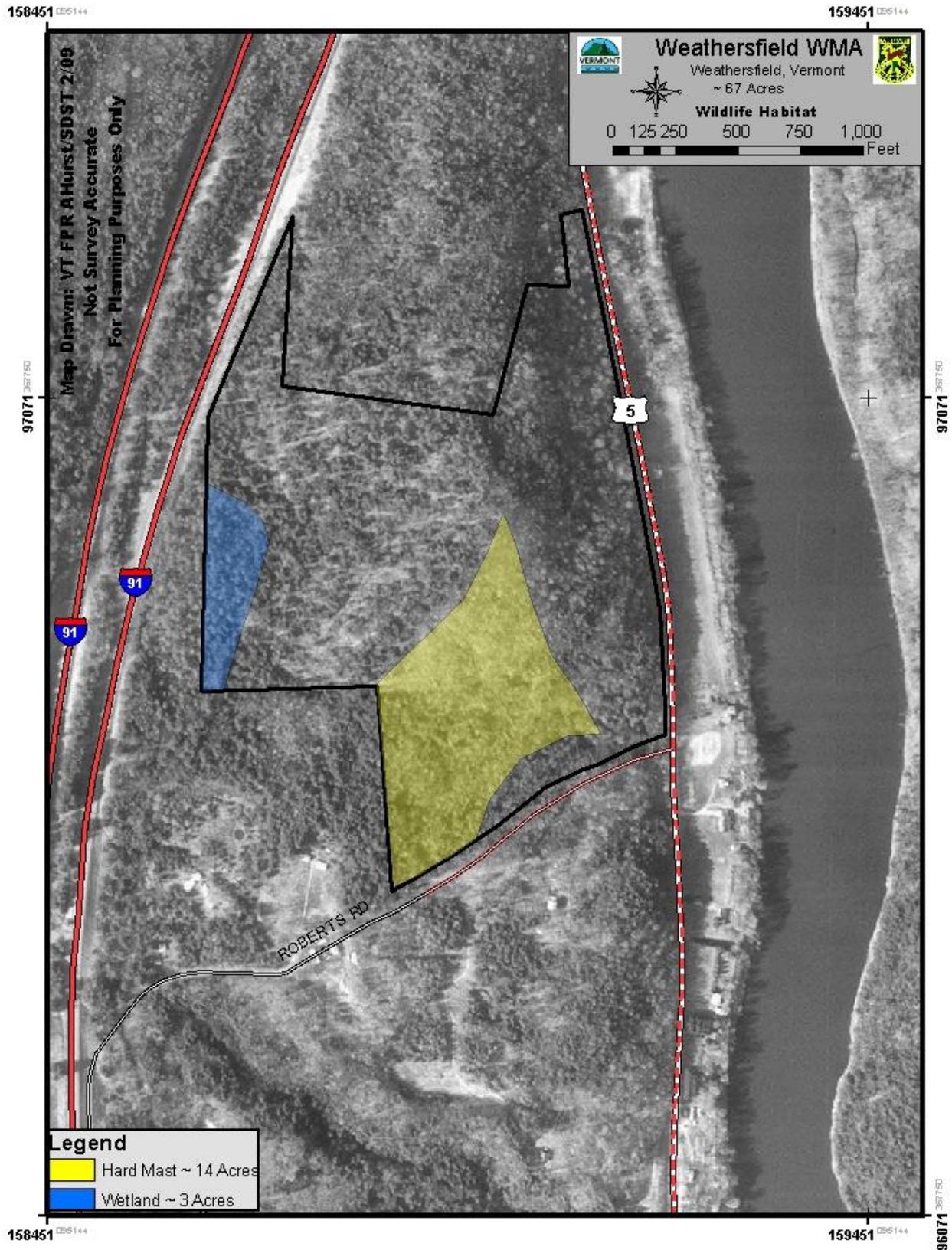
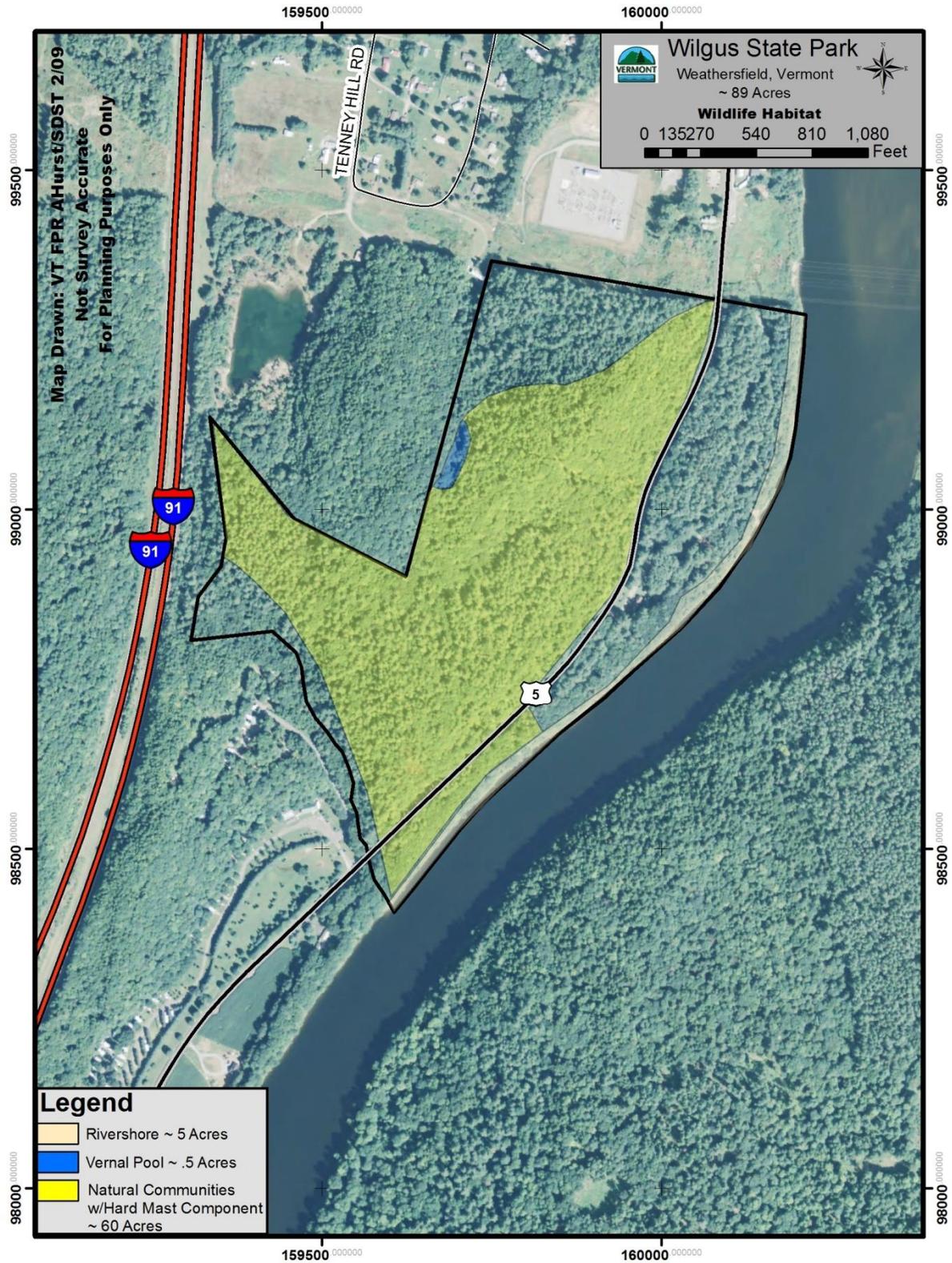


Figure 12: Weathersfield WMA Wildlife Habitat Map



**Figure 13: Wilgus State Park Wildlife Habitat Map**



### III. Aquatic Habitat and Fisheries Assessment

The Ascutney Management Unit (AMU) has a total combined land area of 4,396.67 acres distributed among three wildlife management areas (WMAs): Little Ascutney WMA, Weathersfield WMA, and Skitchewaugh WMA; and two state parks: Mt. Ascutney State Park and Wilgus State Park. All lands are located in the greater Connecticut River basin within which AMU is divided principally among four watersheds: Connecticut River, Black River, Mill Brook-North, or Mill Brook-South. Mill Brook-North refers to the watershed draining lands immediately north of Little Ascutney WMA and Mount Ascutney and discharges to the Connecticut River at Windsor, VT. Mill Brook-South drains the southern slopes of Mount Ascutney and flows into the Connecticut River near Ascutney, VT.

Little Ascutney WMA, 865 acres, lies entirely within the North Branch of the Black River watershed. The 3,132 acres that comprise Mt. Ascutney State Park are portioned among three watersheds: Mill Brook-North, 1,821 acres or 58%; Connecticut River, 962 acres or 31%; and Mill Brook-South, 296 acres or 11%. Streams on the remaining subunits of AMU: Wilgus State Park (89 acres) and Skitchewaugh WMA (216 acres) drain for the most part directly to the Connecticut River. One exception is lands west of the height of land on Skitchewaugh WMA which flow into Spencer Hollow Brook and then into the Connecticut River.

Aquatic habitats located on all subunits of AMU with exception of Wilgus State Park are limited to first and second order streams, small wetlands, and beaver flowages. Wilgus State Park has approximately 3,630' of frontage on the Connecticut River. None of the WMAs or State Parks has any lentic or standing water habitats (lakes, ponds, swamps, bogs) of any significant size or supportive of any noteworthy fish populations.

#### Little Ascutney WMA

Two streams, both unnamed, are of large enough size to appear on most maps of this WMA. The more significant of these is the one that flows along the south side of the WMA's principal access road off Ascutney Basin Road. With a total length of about 1.1 miles, this stream originates at an inactive beaver pond. From there, it flows in a roughly northwesterly direction through another beaver use area, further downstream it drops over a falls near the upper parking lot, and after another 1,300', leaves state land. The stream continues another tenth of a mile before discharging into the North Branch of the Black River.

In August 2006 two sites on the stream were sampled by electrofishing to characterize resident fish communities and estimate trout population abundance. The first site was located just upstream of the snowmobile bridge near the lower gate on the access road. The stream was found to support four fish species: blacknose dace *Rhinichthys atratulus*, creek chub *Semotilus atromaculatus*, brook trout *Salvelinus fontinalis*, and slimy sculpin *Cottus cognatus*. Based on running water fish assemblage types described in A Classification of the Aquatic Communities

of Vermont<sup>1</sup> the fish community conforms to category 3 (brook trout-blacknose dace assemblage). This category includes coldwater streams of moderate size and at high elevation that support brook trout, slimy sculpin, blacknose dace as well as one or more of the following fishes: long nose dace *Rhinichthys cataractae*, longnose sucker *Catostomus catostomus*, and white sucker *Catostomus commersoni*. This assemblage type is ranked a moderate conservation priority.

Total brook trout abundance was estimated (based on a single sample) to be a minimum of 516 fish/mile. The fish sample consisted entirely of young-of-year with a total length range of 59-90 mm. No fish of any kind were observed at the second survey site located upstream of the falls. More informal observations of the beaver use areas also failed to reveal the presence of any fish life. It is surmised from these findings that fish populations are confined to the stream down from the falls (an impassable barrier to the upstream movement of fish), and that the stream has some limited value as spawning and nursery habitat for adult brook trout originating in the North Branch. The limited amount of stream occupied by brook trout on the WMA and fish size leads one to conclude the stream has no direct recreational fishing value.

### **Weathersfield WMA and Skitchewaog WMA**

Weathersfield WMA has no surface waters supporting fish populations. Only two headwater streams, both tributaries to Spencer Hollow Brook, have segments that intersect with Skitchewaog WMA lands and may support fish populations. The last fish population survey of Spencer Hollow Brook was done in 1953. It was reported to have brook trout.<sup>2</sup>

### **Mt. Ascutney State Park**

Elevation and watershed size are important factors determining the uppermost limit of headwater streams that may be expected to support fish populations. Mount Ascutney is drained by numerous small, high elevation streams. Typically these are first and second order streams with drainage areas less than two square miles. Approximately 26% (825 acres) of the state park is situated above an elevation of 2,000'. These parameters have direct bearing on stream bed gradient and seasonal stream flow regimes. Several of the larger streams originating on the state park have average elevation drops in the range of 146-192' per 1,000' stream channel length which equates to average streambed gradients of 15-19%. Additionally high elevation, small drainage area size streams tends to be ephemeral, i.e. seasonally cease to flow above ground in most years. As a consequence, resident fish populations are more apt to occur in low elevation stream reaches which, in the case of Mt. Ascutney State Park, are mostly located outside the park boundary.

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<sup>1</sup> Langdon, R., J. Andrews, K. Cox, S. Fiske, N. Kamman, and S. Warren. 1998. A classification of the aquatic communities of Vermont. Report of The Aquatic Classification Workgroup to The Nature Conservancy and Vermont Biodiversity Project, Montpelier.

<sup>2</sup> MacMartin, J. M. 1962. Vermont stream survey, 1952-1960. Federal Aid to Fisheries Final Project Report F-2-R, Vermont Fish and Game Department, Montpelier.

No fish population data exists for streams in Mt. Ascutney State Park. One site located just outside the park boundary was surveyed in July 2006 as part of a culvert replacement fish passage assessment. The site (elevation 472') is on an unnamed tributary to Mill Brook-North near the intersection of Back Mountain Road (VT Route 44A) and Cole Hill Road in Windsor. Electrofishing below the culvert demonstrated the presence of brook trout. Similarly, another culvert (approximate elevation 925') off South Mountain Road in Weathersfield was evaluated for fish passage in October 2003. The unnamed tributary of Mill Brook-South originates near South Peak on Mount Ascutney. Several age classes of brook trout were observed inhabiting the stream. Therefore, it can be generally assumed that stream reaches near the base of Mount Ascutney that maintain year-round flows or at worse are devoid of surface flow infrequently, such as every few years or so, probably support relatively simple coldwater fish communities consisting of singular species (brook trout: Assemblage Type 1), two species (brook trout-slimy sculpin: Assemblage Type 2), or three or more species fitting Assemblage Type 3. In all cases these streams are of more ecological than recreational significance.

### **Wilgus State Park**

The southern boundary of the park is a small, ephemeral stream that flows directly into the Connecticut River. No fish population data is available; however, it is unlikely that it serves as fish habitat. In terms of sheer size and fish species diversity, the Connecticut River is the most significant aquatic habitat associated with AMU. The river is the eastern boundary of the park with 3,630' of river bank frontage. Access for water-based recreational pursuits, including fishing and boating, is limited due to the steep cut banks that are found the length of the park. The Connecticut River supports primarily a warmwater/coolwater fish community, including such recreationally important species as smallmouth bass *Micropterus dolomieu*, largemouth bass *Micropterus salmoides*, northern pike *Esox lucius*, and walleye *Sander vitreum*. The river is seasonal habitat for several coldwater fishes, namely rainbow trout *Oncorhynchus mykiss*, anadromous Atlantic salmon *Salmo salar*, and brown trout *Salmo trutta*. In addition to the foregoing, other fishes that may be expected to occupy suitable habitats in proximity of the park are anadromous sea lamprey *Petromyzon marinus*, American eel *Anguilla rostrata*, chain pickerel *Esox niger*, a half dozen or so species of cyprinids (minnows, carp, etc.), white sucker, brown bullhead *Ameiurus nebulosus*, several sunfishes (pumpkinseed *Lepomis gibbosus*, bluegill *L. macrochirus*, redbreast sunfish *L. auritus*, rock bass *Ambloplites rupestris*), yellow perch *Perca flavescens*, and tessellated darter *Etheostoma olmstedii*.

During the summer of 2007, Biodiversity LLC conducted a survey of freshwater mussels in the Connecticut River in the vicinity of Wilgus State Park. The survey of a 24,000 square foot area in the river was done under a contract with the Parks Department to identify the presence of mussels prior to reconstruction of the park's canoe launch. Five mussel species were observed (in order of decreasing abundance): eastern elliptio *Elliptio complanata*; eastern lampmussel *Lampsilis radiata*; dwarf wedgemussel *Alasmidonta heterdon*; creeper *Strophitus undulatus*; and triangle floater *Alasmidonta undulate* (M. Ferguson, Vermont Fish & Wildlife Department, personal communication). The dwarf wedge mussel is an endangered species listed by both U.S. Fish & Wildlife Service and State of Vermont. The upper Connecticut River between Vermont and New Hampshire is believed to be one of the highest, most dense dwarf wedge mussel populations remaining throughout its North American range.

Issues/Concerns:

- Habitat alteration: channelization (the straightening, widening and/or deepening of stream channels) alters natural channel morphology and fluvial processes and eliminates or reduces in-stream habitat necessary to support by aquatic populations; loss or reduction of forested riparian areas reduces channel shading resulting in elevated water temperatures detrimental to coldwater species and reduces recruitment of large wood important, an important habitat component.
- Habitat fragmentation: placement of dams and culverts on streams creates impassable barriers to aquatic organisms eliminating their access to upstream spawning and refuge areas or ability to recolonize depleted populations.
- Sedimentation and water pollution: runoff from logging sites and unstable roads, streambank erosion and in-stream channel disturbance can elevate sediment load as well as certain pollutants discharged to surface waters impacting spawning and rearing habitats needed by aquatic life or may result in direct mortality.

Brook trout is a Species of Greatest Conservation Need in Vermont<sup>3</sup> and the focus of the Eastern Brook Trout Joint Venture (EBTJV), a partnership of public and private agencies and organizations dedicated to the conservation, enhancement, and restoration of brook trout throughout its eastern range. As a state public partner to the EBTJV, Vermont has identified specific short- and long-term strategies to conserve and enhance brook trout habitat, populations, and recreational opportunities.<sup>4</sup>

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<sup>3</sup> Kart, J., R. Regan, S. R. Darling, C. Alexander, K. Cox, M. Ferguson, S. Parren, K. Royar, and B. Popp, editors. 2005. Vermont's Wildlife Action Plan. Vermont Fish & Wildlife Department, Waterbury. Available: [www.vtfishandwildlife.com](http://www.vtfishandwildlife.com).

<sup>4</sup> Kirn, R. 2007. Vermont brook trout conservation strategies. Prepared by Vermont Fish & Wildlife Department for Eastern Brook Trout Joint Venture. Available: [www.easternbrooktrout.org](http://www.easternbrooktrout.org).

## IV. Recreational Assessment and Maps

### *Recreation Goals for the Ascutney Management Unit (AMU)*

The two state parks in the AMU fit well together for offering a diverse range of recreational activities. The two parks, Mt. Ascutney and Wilgus, are each unique in their offerings but complement one another. Over the life of this plan, recreational opportunities at Wilgus State Park will be preserved and promoted while opportunities at Mt. Ascutney State Park will be realigned and enhanced to match visitor demand and resource carrying capacity.

#### **Wilgus State Park**

- Preserve the existing riverfront camping experience and capitalize on successes.
  - Improve facilities as needed.
  - Add a few additional cabins and/or some electrical hookups to accommodate demand.
  - Enhance the group camping area as needed.
- Maintain and enhance river-based recreation/paddling opportunities.
- Promote and enhance day use riverside recreation around the river viewing platform.

#### **Mt. Ascutney State Park**

- Realign camping offerings to meet demand.
  - Decommission southern campground area.
  - Reconstruct northern campground area to accommodate trailers and RVs.
  - Develop a select number of remote camping sites strategically spaced along the mountain parkway.
  - Develop a group camping area around the mountainside picnic pavilion area.
- Enhance Day Use offerings
  - Rehabilitate CCC “rec hall” to accommodate day use functions.
  - Maintain hiking trail system as dispersed recreational opportunities.
  - Maintain mountain auto parkway, realign fees, and promote to increase use and attendance.
  - Work with partner organizations to construct and promote other types of dispersed trail recreation-mountain bikes and horses within resource capabilities in select and limited areas.

The five state properties that comprise the AMU are located within the Connecticut River Valley on the western side of Vermont. Population centers close to the AMU include the town of Springfield and the villages of Ascutney and Windsor in Vermont and the city of Claremont in New Hampshire. Two different categories of recreational opportunities are experienced by the public within the AMU.

The campground areas located within Mt. Ascutney and Wilgus State Parks are characterized by high recreational use and substantial modifications to the property including buildings, parking lots, and roads. The campgrounds are supervised by park attendants and are heavily used by people during the park season. Busy roads are located adjacent to the two campgrounds with the sound of vehicle traffic constantly in the background. The paved mountain road, the three main hiking trails within Mt. Ascutney State Park, and the summit area of Mount Ascutney also experience high recreational use especially during the summer and fall. Sights and sounds of people are expected and readily evident in all of these areas; and the chance of contact with other recreational users is high.

A recreational experience in a less developed environment with fewer people is found at Little Ascutney, Skitchewaug, and Weathersfield WMAs and in the areas outside of the developed campgrounds at Mt. Ascutney and Wilgus State Parks. These areas are characterized by a natural-appearing setting with woods roads and trails. Contact with other users is generally low, but evidence of other users is high. All of these areas are located less than one half mile from maintained town roads.

### **Weathersfield WMA**

Weathersfield WMA contains 80 acres located between US Route 5 and Interstate 91 approximately 2.5 miles south of the Village of Ascutney. This WMA is accessed on the western side by Roberts Road, a class 3 town gravel road that turns to an impassable section of discontinued road just beyond where it abuts the WMA; there is no access off of Route 5.

Hunting is the only recreation that we know of that occurs on the WMA.

### **Skitchewaug WMA**

Skitchewaug WMA contains a total of 235 acres in two blocks. The Mountain Block contains 216 acres and is bounded on the west by Interstate 91 and on the east by Route 5. There is no developed access to this block making public recreational access very difficult. The only legal access to this parcel is a permanent right-of-way from Route 5 that starts in a private driveway and crosses private land. This right-of-way is steep with several sharp turns making it unusable for public access.

Hunting activity occurs on the Mountain Block primarily from hunters accessing the property from adjoining private lands. Most of the activity centers around deer season; however, turkey, ruffed grouse, and gray squirrels are likely also hunted here.

Approximately 0.5 mile of secondary snowmobile trail crosses through the center of the Mountain Block of Skitchewaug WMA. This section of trail is maintained by the local snowmobile club named the Skitchewaug Trail Riders.

Wildlife viewing is a popular activity in the vicinity of the Mountain Block of Skitchewaung WMA. Bird watchers often will park along the turnout on Route 5 near Mollica's Christmas tree plantation hoping to get a glimpse of the peregrine falcons or ravens nesting on the cliffs.

The Spencer Brook Block of Skitchewaung WMA contains 19 acres of wetlands and uplands bordered by Interstate 91 and Route 5 and accessed from Route 5. Trapping is likely one of the few activities that occur on this property.

### **Little Ascutney WMA**

Little Ascutney WMA contains 860 acres. Public access to the main portion of the WMA is provided off the Ascutney Basin Road (a gravel surfaced class 3 town road). Two public parking areas are maintained on this side of the WMA. The lower parking area is located right off the Ascutney Basin Road. From here, a gated gravel surfaced road approximately 0.3 mile in length and very steep provides access to the upper parking lot. The access road to the upper parking lot is gated during mud season to protect the road from damage. These parking areas are not plowed during the winter.

Access to the east side of Little Ascutney WMA is provided by the Kimball Farm Road, the last 0.1 mile of which is a class 4 unmaintained road. Access to the hunting rights area of Little Ascutney WMA is provided by the Little Ascutney Road, a gravel surfaced class 3 town road.

Little Ascutney WMA receives a great deal of hunting pressure. Much of the hunting activity centers around the fall deer seasons including bow, rifle, and muzzleloader. Ruffed grouse, turkeys, coyotes, and gray squirrels are also hunted on the property.

The North Branch of the Black River is located along a section of the southwestern portion of Little Ascutney WMA and provides opportunities for native brook trout fishing.

Snowmobiling is a popular winter activity within Little Ascutney WMA. VAST corridor trail #5 follows the old town road through Ascutney Notch. Little Ascutney WMA has approximately 380' of frontage on this trail that is heavily used and groomed regularly. A secondary snowmobile trail cuts through the western side of Little Ascutney WMA following a network of skid roads. Both trails are maintained by the local snowmobile club named the Weathersfield Pathfinders.

Proposals for creating mountain bike trails on Little Ascutney WMA were submitted in 2011. Initial approval was given for the shortest section though final approvals from the Wildlife Division Director remains to be completed before any physical work is done.

## **Mt. Ascutney State Park**

Mt. Ascutney State Park contains 3,132 acres with the main access through the campground entrance off Route 44A. Other access points include three trailhead parking lots dispersed around the base of the mountain and several vehicle pull-offs along Route 44A.

Mt. Ascutney State Park contains some of southeastern Vermont's most popular and heaviest used hiking trails. Four major trails totaling approximately 12 miles in length start at the base of the mountain and climb to the summit. Scenic waterfalls, sites of historic interest, and great views are all found along the trail system. All four trails are located entirely on State-owned land or easements, with the Windsor Trail being the last to be protected through the purchase of the Miller property in 2000. The three trails located outside of the campground area have their own trailhead parking lots maintained by the Department of FP&R. A network of summit trails provides access to the mountaintop for visitors who drive or ride up the paved mountain road. A 25' tall observation tower located near the summit provides hikers with views of Vermont and New Hampshire.

The Ascutney Trails Association (ATA) helps to maintain the Weathersfield, Brownsville, and Windsor Trails through a cooperative agreement with the State of Vermont. The ATA also publishes a trail guidebook and sponsors an annual picnic.

Hang gliding and paragliding occur on two authorized sites within Mt. Ascutney State Park; Brownsville Rock and South Peak. The most popular launch sites are located on West Peak within the West Windsor Town Forest and are accessed by the "Hang Glider Trail" that crosses state land.

Currently there are no official VAST snowmobile trails located within Mt. Ascutney State Park although trails have been active here in the past. The Mountain Road receives a great deal of snowmobile use from crews working on facilities at the communications site during the winter months.

Proposals on Mt. Ascutney State Park and Little Ascutney WMA for re-opening a VAST trail and creating mountain bike trails were submitted in 2010 and 2011. Portions of both proposals were approved though final approvals from the Agency of Transportation and Natural Resources Board (Act 250) remain to be completed before any physical work is done.

Ice climbing occurs at several locations within the park. Popular spots for this activity include Cascade and Little Cascade Falls, the Flume, and at a ledge along the lower section of the Brownsville Trail. Snowshoeing is a popular activity on the hiking trails during the winter with the most activity occurring on the Weathersfield Trail. All three of the main trailhead parking lots are plowed during the winter.

Hunting is a popular activity on portions of the park. Most of the activity centers around the fall deer seasons and the spring and fall turkey seasons.

The 3.8 mile long steep and windy Mountain Road usually hosts several recreational events every year. The Sports Car Club of New Hampshire conducts hill climb time trials on the road two weekends a year, with the Mountain Road being closed to the general public during those events. Organized bike climbs and foot races have also been held on the road.

## **Wilgus State Park**

Wilgus State Park contains 89 acres with the main access through the campground entrance off Route 5. Points of access to the section of the park located west of Route 5 include a heavily used pull-off along Route 5 and a trail that comes in on the back side along the interstate through the Town of Weathersfield property.

Two short hiking trails are located within the park. The Pinnacle Trail is an approximately 1.0 mile long loop trail that climbs to the top of the ridge located west of Route 5 at a 628' elevation offering views of the Connecticut River and New Hampshire. The Wilgus Nature Trail provides a 0.5 mile walk on level terrain with tree id and informational signs posted along the path and a viewing platform that provides hikers with views of the Connecticut River and its wildlife.

Canoeing, kayaking, and fishing are very popular activities within the park, and a canoe/kayak launch site provides visitors with great access to the Connecticut River. Wilgus' group camping area is very popular with kayakers and canoers traveling along the river. Wilgus State Park currently offers kayak and canoe trips on the river including boat rentals and shuttle service through a partnership with a local outfitter. According to local fishermen, the smallmouth bass fishing along this section of the river is very good.

A limited amount of hunting activity occurs on the western portion of the property. Most of this activity centers around the fall deer seasons and the fall squirrel season.

Figure 14: Little Ascutey WMA Recreational Opportunities

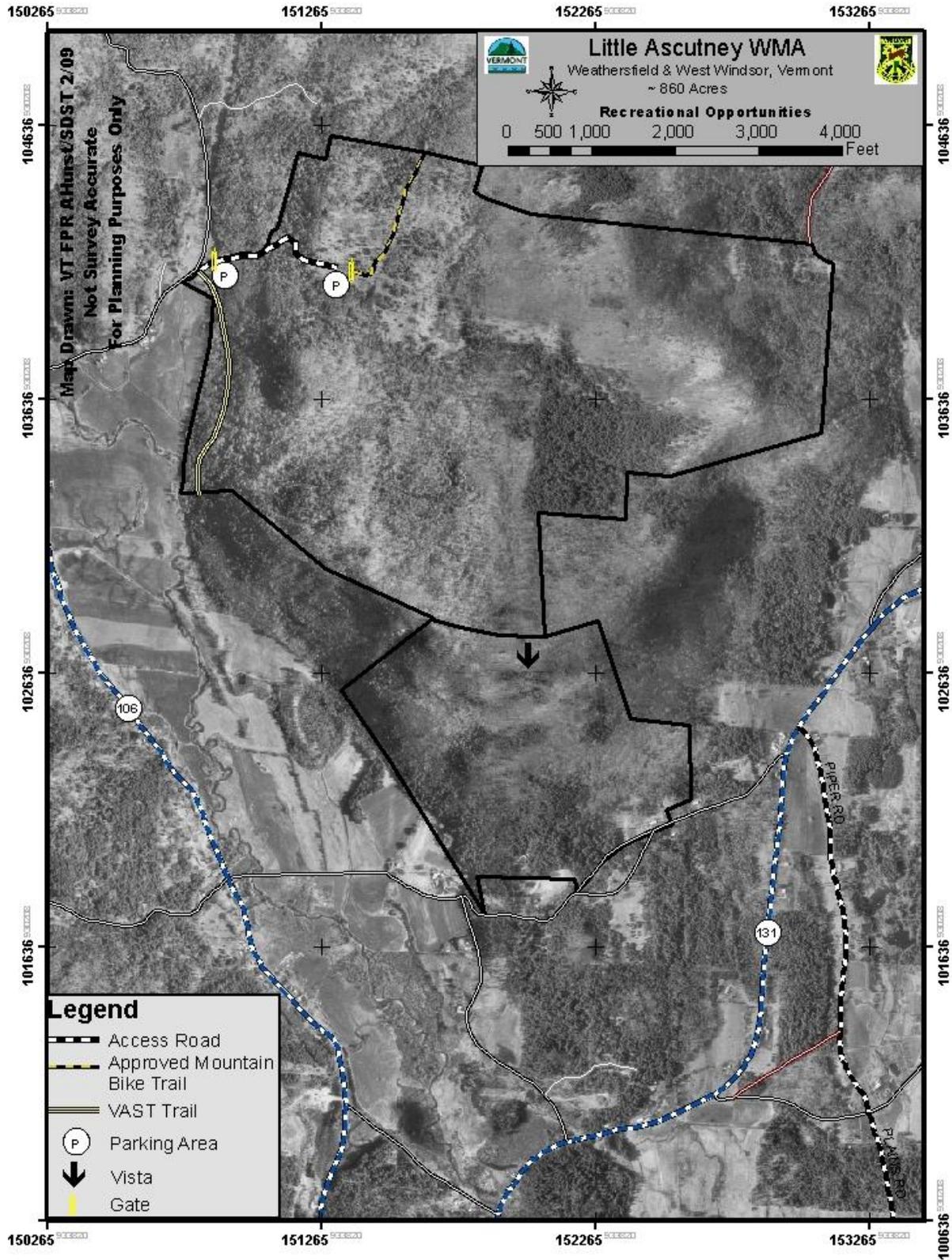


Figure 15: Mt. Ascutney State Park Recreational Opportunities

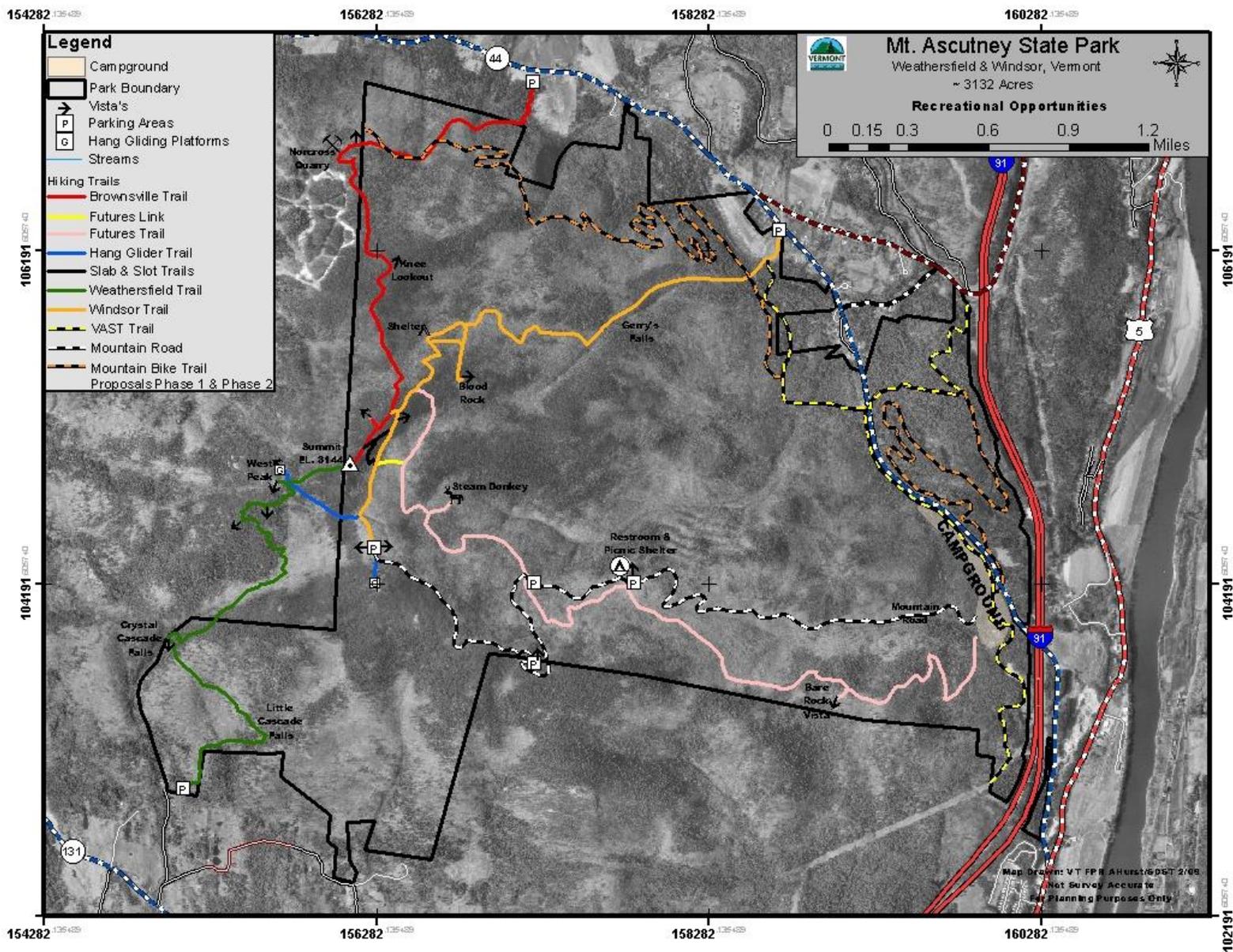
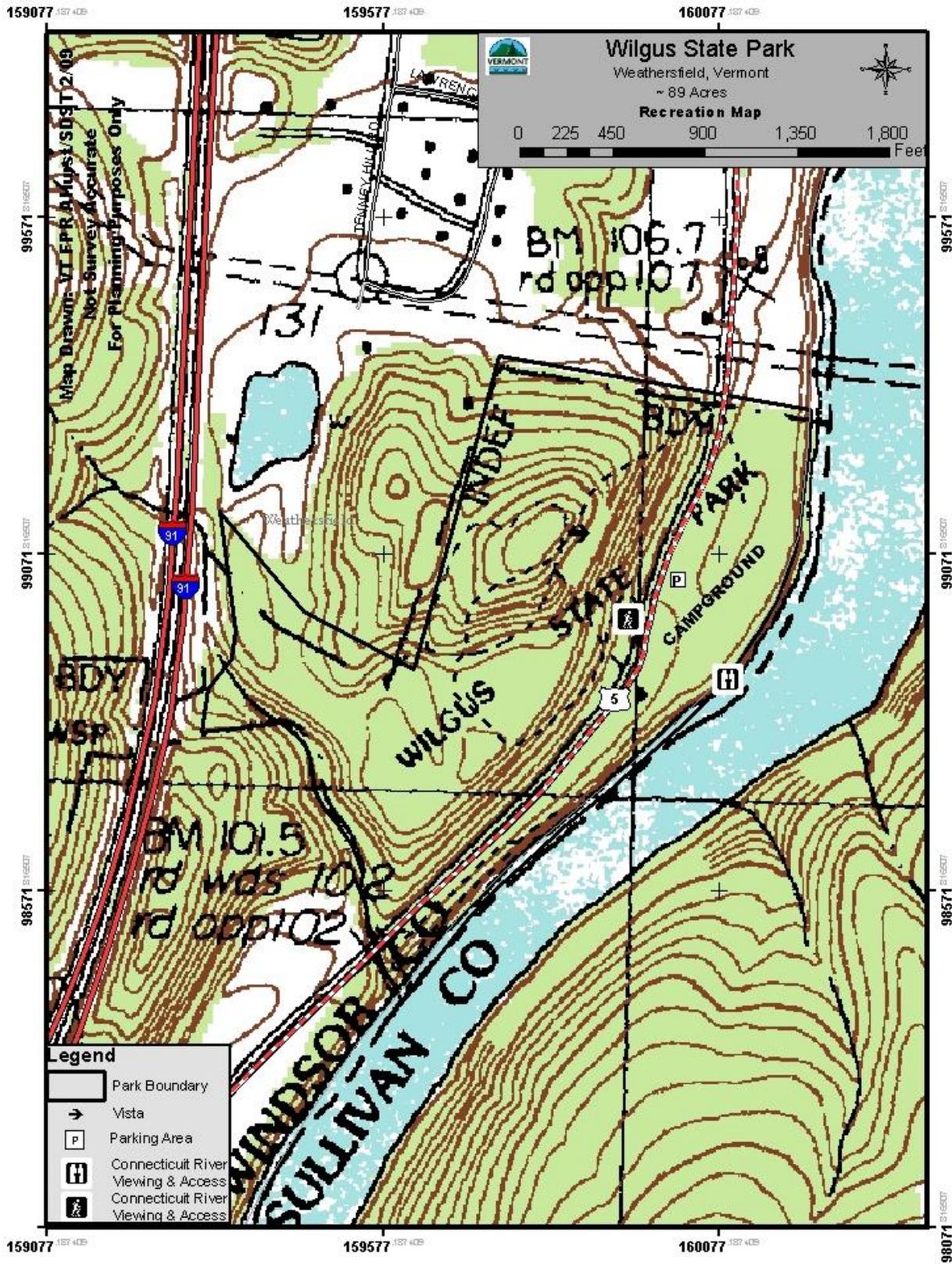


Figure 16: Wilgus State Park Recreational Map



## V. Timber Assessment, Stand/Soil Maps and Inventory Summary

### Little Ascutney WMA

For both habitat and timber objectives, Little Ascutney WMA is an excellent parcel. Approximately 600 acres is considered manageable based on terrain and access. Soils are generally very productive and stand and site quality is generally suited to one or both objectives.

#### *Dominant Forest Types*

Type/Acres*	Major Species	Condition	Quality	Regeneration
Northern Hardwood 338 acres	Sugar Maple 10-60% Hophornbeam 5-23% American Beech 14% Bitternut Hickory 0-15%	Polesize to sawtimber. Understocked to overstocked. Excellent growth on deeper soils. Slow growth on dry shallow soils on peaks.	Quality for timber and wildlife objectives is generally high.	Generally poor and heavily browsed honeysuckle encroachment on lower slopes and near fields and orchards.
White Pine 174 acres	White Pine 67% Hemlock 11%	Poor quality small sawtimber on soils that range from shallow on ledge to deep and productive.	Overall poor quality stems. Crown vigor variable.	Abundant in places. Hardwood and white pine competing with beech and striped maple.
Eastern Hemlock 105 acres	Hemlock 49% Sugar Maple 17% Beech 14%	Generally vigorous stands growing on steep, rocky ground.	Overall poor timber quality. Excellent quality for deer wintering.	Generally poor. Spotty hemlock, yellow birch, and pine competing with beech, hardhack, and striped maple.

\*managed acres

#### Soil/Site Potential

There are approximately ten different soil types on Little Ascutney WMA. A large portion of the area's terrain is mapped as having steep to very steep slopes but with highly productive soils. Brief descriptions of the four main soils types comprising approximately 88% of the area's total acreage follow.

*Lyman-Tunbridge Complex* – very rocky. This soil is mapped as covering approximately 38% of this WMA. Lyman-Tunbridge is typically found on steep and very steep ridges and side slopes of hills and mountains. It consists of about 50% shallow excessively drained Lyman soils and 35% moderately deep well-drained Tunbridge soils. Lyman-Tunbridge is classified as Site III in forest productivity. It is a site, however, where important wildlife trees such as hickory, oak, and hardhack are competitive and productive.

*Buckland Fine Sandy Loam* – very stony. This soil is mapped as covering approximately 20% of this WMA. Buckland consists of very deep, well-drained soils typically found on moderately steep ridges and side slopes of hills. Depth to bedrock is greater than 60 inches and available water capacity is high. Buckland is classified as Site I in forest productivity. The best quality and growth hardwood stands on the WMA are underlain by this soil type.

*Vershire-Dummerston Complex* – rocky. This soil is mapped as covering approximately 15% of this WMA. Vershire-Dummerston is typically found on steep and very steep side slopes of hills and mountains. It consists of about 60% moderately well-drained Vershire soils and 25% very deep well-drained Dummerston soils. Depth to bedrock varies from 20 to greater than 60 inches. Vershire-Dummerston is classified as Site I in forest productivity. It is highly productive for white pine and is the soil type underlying a number of pine stands.

*Glover-Vershire Complex* – rocky. This soil is mapped as covering approximately 15% of the WMA. It is typically found on steep and very steep side slopes of hills and mountains. It consists of about 60% shallow, excessively-drained Glover soils and 30% moderately deep, well-drained Vershire soils. Depth to bedrock varies from 10 to 40 inches. This soil is classified as Site II in forest productivity. A number of excellent younger stands with a high component of oak, pine, hickory, and sugar maple are found on this soil type.

### Tree/Regeneration Quality

Overall timber quality and tree health on Little Ascutney WMA is excellent. On productive soils, stands are well stocked with small sawtimber and pole size trees. Stands have made dramatic improvements after aggressive cutting by the previous owner, exceeding expectations. This is attributed to the highly productive soils, calcium-rich bedrock, and the crown full release of retained trees. In areas where timber quality is low and soils poor, there is often a high stocking of important mast species such as red oak and bitternut hickory. An exception is the generally poor quality of white pine on the parcel from a timber standpoint, though these stands are providing excellent wildlife cover.

Tree regeneration is often poor, with a mix of hardwood being heavily browsed by abundant white-tailed deer; the exception being patch clearcuts done in 2007 and 2008 which appear to be regenerating well.

### Access/Operability

There are two roads leading into the WMA. One, an impassible class IV road on the east side and the second, the main access on the west side. The access road is extremely steep and difficult for log trucks and trailers. It is too steep for winter use. For trailers to negotiate the steep curves, ditches have to be temporarily filled and the road widened. After operations, ditches have to be restored. There is no other possible road location for the main access.

Operability is hampered by the frequency of the wet or moist soils. Ideally logging would occur here in the winter, but the steep truck road makes that impossible. Skid roads are easily eroded requiring thorough closeout after harvests.

#### History of Management/Potential

During the first half of the preceding management period, work focused on rebuilding the access road and interior skid roads that had been left in a degraded condition by the previous owner. In addition, a number of meadows were restored and placed on an annual mowing schedule. In the last five years, the focus was on vegetative management. Completed were the release of numerous apple trees, pre-commercial thinning of 70 acres of young mast trees such as oak and hickory, and a commercial timber sale that thinned 35 acres and created early successional habitat with 23 acres of patch clearcut in 11 units.

Productive soils, a diverse tree species mix, healthy trees, and a good interior road network will allow for continued successful tree management on the parcel. Keeping the steep access road continually maintained and usable is critical to future management. Control of invasive shrubs will also be an important consideration in this management period.

#### Current/Future Concerns

- Management access off Kimball Farm Road on the east side.
- Ongoing maintenance and preservation of the main access road.
- Spread of the invasive shrub, honeysuckle species.
- Erodible and, in cases, wet soils.

#### Current/Future Opportunities

- A second sale unit to create early successional habitat through patch cuts.
- Possible thinning of white pine stands if access is gained.
- Ongoing care of mowed meadows.
- An abundance of mast producers (oak, hickory, hardhack).
- Apple trees.
- Wetland habitat.
- Highly productive soils.
- Denser upper elevation stands that can be managed for interior songbirds and wild turkeys.

### **Mt. Ascutney State Park**

Much of Mt. Ascutney State Park is inaccessible for management due to steep, inoperable slopes. Of the 3,131 acres in this unit, approximately 800-1,000 acres are on terrain moderate enough for timber management. The best ground, reasonably flat and well drained, is found on the “McClary Lot” east of Route 44A.

### *Dominant Forest Types*

<b>Type/Acres*</b>	<b>Major Species</b>	<b>Condition</b>	<b>Quality</b>	<b>Regeneration</b>
Northern Hardwood <i>521 acres</i>	Sugar Maple American Beech Black Birch Red Maple Hemlock	Polesize to sawtimber. Moderately stocked to overstocked.	Variable	Often poor – American beech and striped maple with honeysuckle encroaching. Heavy browsing pressure.
White Pine-Hemlock <i>366 acres</i>	White Pine Hemlock	Mature to overmature sawtimber. Moderately stocked.	High	Mixed, often poor as above.
Eastern Hemlock- Yellow Birch <i>196 acres</i>	Hemlock White Pine Red Spruce Yellow Birch	Mature to overmature sawtimber. Moderately to overstocked.	High	Spotty, occasionally black birch and hemlock.

*\*managed acres*

#### Soil/Site Potential

Timber management potential is limited by terrain over much of Mt. Ascutney State Park. Dominant soils in manageable areas include:

*Hinckley Sandy Loam and Windsor Loamy Fine Sand* – well drained productive soils for coniferous trees such as white pine and Eastern hemlock. Found primarily east of Route 44A. Parent material: Sandy Glaciofluvial deposits.

*Tunbridge-Lyman Complex* – stony but productive, well drained, loamy soils for Northern hardwood. Parent material: Glacial till.

#### Tree/Regeneration Quality

Most accessible stands are stocked with pole to large sawtimber size trees. Stem quality ranges from poor in areas cut over by previous owners to high in areas with a long history of management on the lower elevations. Sawtimber stocking is high in many areas. Regeneration is problematic in many areas with moderate to high densities of American beech, striped maple, and Japanese honeysuckle. Beech and striped maple will create low productivity monocultures over the long term. Honeysuckle is known to displace native species. Several areas with dense white pine regeneration, a rarity in southeastern Vermont, are found on the McClary Lot.

#### Access/Operability

Most managed areas have excellent access off state roads and an internal road and skid trail network. Several areas on steep side slopes of Ascutney Mountain may prove to be inoperable but for now are projected to be accessible. Interior roads are in reasonably good shape. Some road/trails are being damaged and eroded by unauthorized off-roading.

## History of Management/Potential to Meet Future Goals

In the preceding LRMP, 427 acres of the 2,800-acre parcel was in an active management class. That plan, scheduled three timber sales from 1993-2008, all of which have been completed with a total harvest of 440,000 board feet and 855 cords. These treatments were quite successful in improving the growth of residual crop trees, particularly white pine and on drier sandier sites, develop pine seedlings. Harvest has also aided the spread of honeysuckle and other invasive shrubs from field edges and utility rights-of-way. Invasives can also be found in unmanaged areas when near a seed source. Regeneration in hardwood harvests has been poor, dominated by beech sprouts and striped maple seedlings.

Species composition of the overstory is well suited to the goals of timber and habitat management, as is the understory layer in places where white pine seedlings are dominant. To be successful in the long-term in the goal of managing for a productive and diverse mix of native tree, shrub, and herbaceous species, invasive plants will need control. In addition, the ability of beech and striped maple to dominate the vegetation in conservative harvests indicates new approaches will be needed.

## Current/Future Concerns

- Invasive shrubs found at lower elevations – in particular Japanese honeysuckle.
- Likely archeological history of river/stream terraces.
- Damage to road networks by unauthorized off-roading.
- Poor regeneration after harvest, partly due to heavy browsing of desired regeneration by white-tailed deer.
- Possible aesthetic impacts of harvest at mid elevations.

## Current/Future Opportunities

- Small stands of red oak and bitternut hickory with high timber and wildlife potential.
- Excellent white pine regeneration in places.
- Areas of large, high quality white pine sawtimber with good access and operability.
- Stands of high quality sugar maple sawtimber.
- Well-drained soils operable in most seasons with access to tar roads for trucking.
- Demonstration areas of long-term forest management accessible to the public.

## **Skitchewaug WMA**

Approximately half of the main block of Skitchewaug WMA, the western side, is accessible for timber management. The eastern portion is inaccessible, and timber rights are retained by others on the far northern portion. Portions of the eastern unit are accessible for non-commercial habitat improvement. Total manageable acres are estimated at 120 acres. The parcel is generally mixed softwood and hardwood on somewhat dry and poor soils with a number of excessively wet areas, including several black ash-black gum swamps.

### *Dominant Forest Types*

<b>Type/Acres</b>	<b>Major Species</b>	<b>Condition</b>	<b>Quality</b>	<b>Regeneration</b>
White Pine-Hemlock <i>130 acres</i>	Eastern Hemlock 32-35% White Pine 13-23% Oak-Hickory 15%	Sawlog size stands with pockets of pole timber. Vigor generally poor to fair. Site quality generally low. Access poor.	Poor to fair for timber. High in many areas for habitat goals.	Poor. Scattered hemlock with occasional invasive shrubs. Occasional white pine regeneration and large sapling black birch.

#### Soil/Site Potential

Management potential is somewhat limited by dry, shallow soils with frequent ledge outcrops and occasional ledge-lined wet areas. Those same conditions, however, create some small stands of uncommon species such as shagbark hickory, chestnut oak, black oak, white oak, black gum, and black ash.

Dominant soils include:

*Glover-Vershire Complex* – Shallow, somewhat excessively drained with bedrock at from 16” to 29” and occasional ledge outcrops. Moderate to low fertility. Soils conducive to regenerating softwood and oak and to selection of white pine, oaks, and hickories as crop trees.

*Vershire-Dummerston Complex* – Moderately deep and well drained. Depth to bedrock 20”-60”. Moderately fertile. The most productive soils on the parcel, primarily found where timber rights are not retained.

#### Tree/Regeneration Quality

Timber quality is generally poor to fair. Much of the pine and hemlock show evidence of red rot and ring shake, and the larger hardwood are often lower grade sawtimber. Found throughout both stands, however, are higher quality pole size stems of black birch, red oak, hickory, and sugar maple.

Regeneration is limited and often heavily browsed due to the proximity to deer wintering areas on the WMA and adjacent private lands. Patches of good quality hemlock and white pine regeneration can be found as well as pockets of black birch large sapling and pole trees in pervious small clearcuts. Near Interstate 91 barberry and honeysuckle are becoming common.

#### Access/Operability

The legal right-of-way from Route 5 is impassable to log trucks. The terrain here offers no solution. The eastern section is unlikely to ever be accessible to log trucks. The western portion has and can be accessed through temporary agreement with Gurney Brothers across their quarry

parcel. They have consistently allowed the State management access but are clear in not wanting public access over their lands. They actively use the stone quarry adjacent to the WMA and currently have no interest in selling this parcel to F&W as a way to gain permanent access. Long term, this is the only way to secure permanent public and management access.

Operability is hampered on the eastern unit by a series of intermittent streams and wet areas. Winter logging will be a necessity here.

#### History of Management/Potential to Meet Future Goals

Before State ownership, most of the property was wooded pasture. Since the 1960s, a number of harvests have occurred on the parcel though none have occurred since 1985.

Even with access limitations, the parcel has a high potential to meet management goals. There are a number of unique habitats, and a high stocking of mast-producing trees. The eastern area is well stocked with young mast trees that could be managed non-commercially, and the western timber stands contain both harvestable timber and crop trees for retention.

Eastern hemlock is an important tree species here to meet wildlife goals. In the near term, it is at risk of loss or degradation to hemlock woolly adelgid which is currently found at a small number of sites in the Connecticut and West River valleys.

#### Current/Future Concerns

- Lack of access from Route 5, tentative access from Route 143.
- Winter logging only.
- Invasive exotic shrubs.
- Limited and heavily-browsed regeneration.
- Possible loss of hemlock to hemlock woolly adelgid.

#### Current/Future Opportunities

- Potential for mast tree release of mast trees on east side.
- Purchase of adjacent parcel(s) to gain permanent access remains a priority.
- Retention of uncommon tree species.
- Pockets of good pine regeneration.
- Pockets of high quality crop trees.

### **Weathersfield WMA**

The Fish & Wildlife Department does not have management or timber rights to this parcel. While the public has access rights, the right to harvest timber is held by a private company.

Should the timber rights be offered to the State, there is reason to consider acquiring them. There are a number of attributes that would meet common goals of State ownership and a few deficiencies. The parcel may be better suited as a State Forest versus a Wildlife Management Area for these reasons, including:

#### Positive Attributes

- An existing skid road network in good condition and well laid out.
- A site that could be developed into public parking.
- Several unique natural communities (Mesic Maple-Ash-Oak-Hickory; Red Maple-Black Ash Seepage Swamp and Rich Northern Hardwood Forest).
- Excellent “local” recreation potential.
- Several important but uncommon wildlife mast tree species including bitternut hickory and white oak.
- Stands of pole size oak and pockets of softwood cover.
- Productive soils and high potential for timber management.
- Proximity to the district office.

#### Drawbacks

- Limited hunting potential due to size.
- Difficult parcel to find.
- Public access from Route 5 on foot would be difficult due to lack of parking and steep ground.

Figure 17: Little Ascutey WMA Forest Stands Map

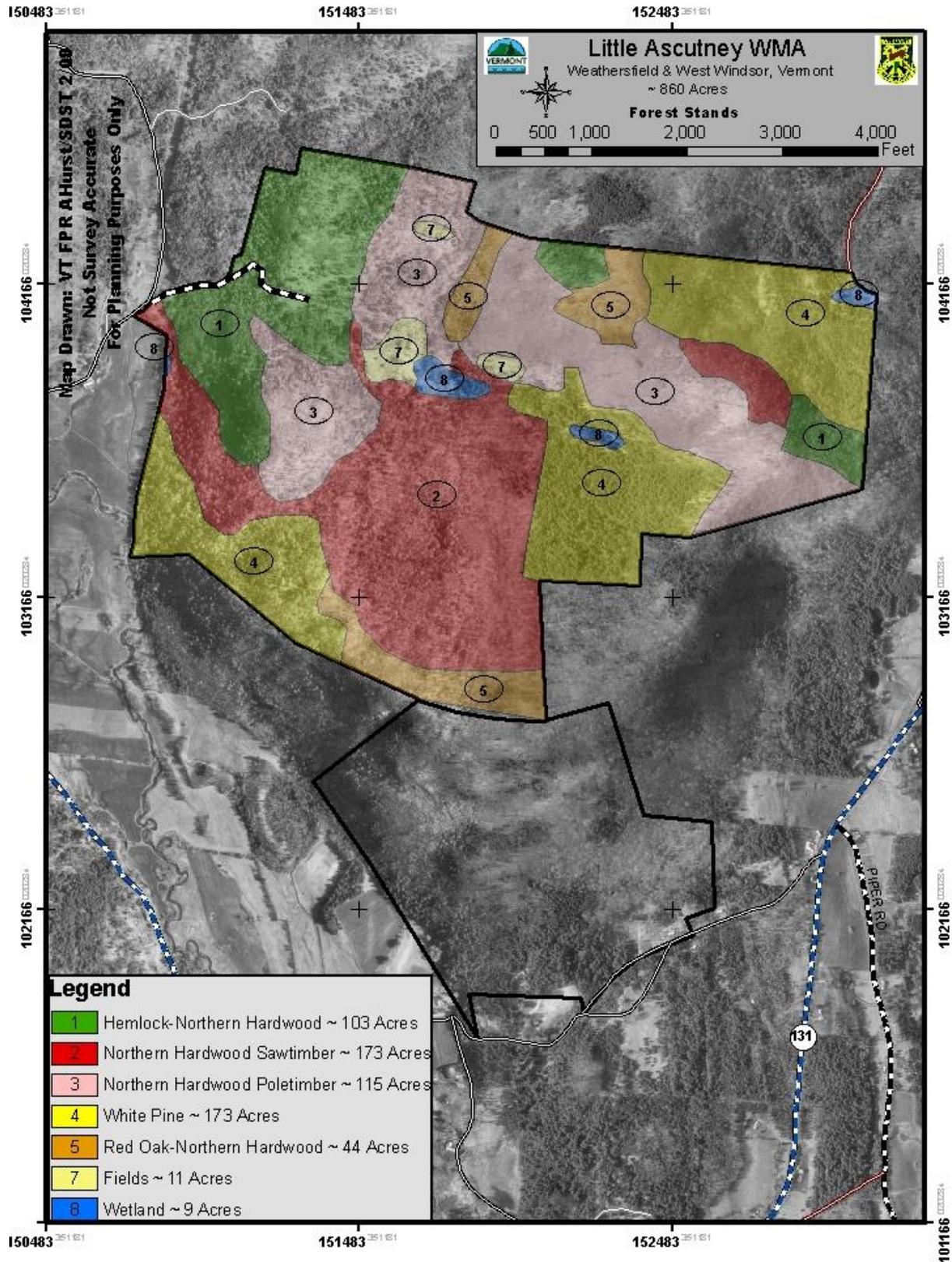


Figure 18: Little Ascutney WMA Soils Productivity Map

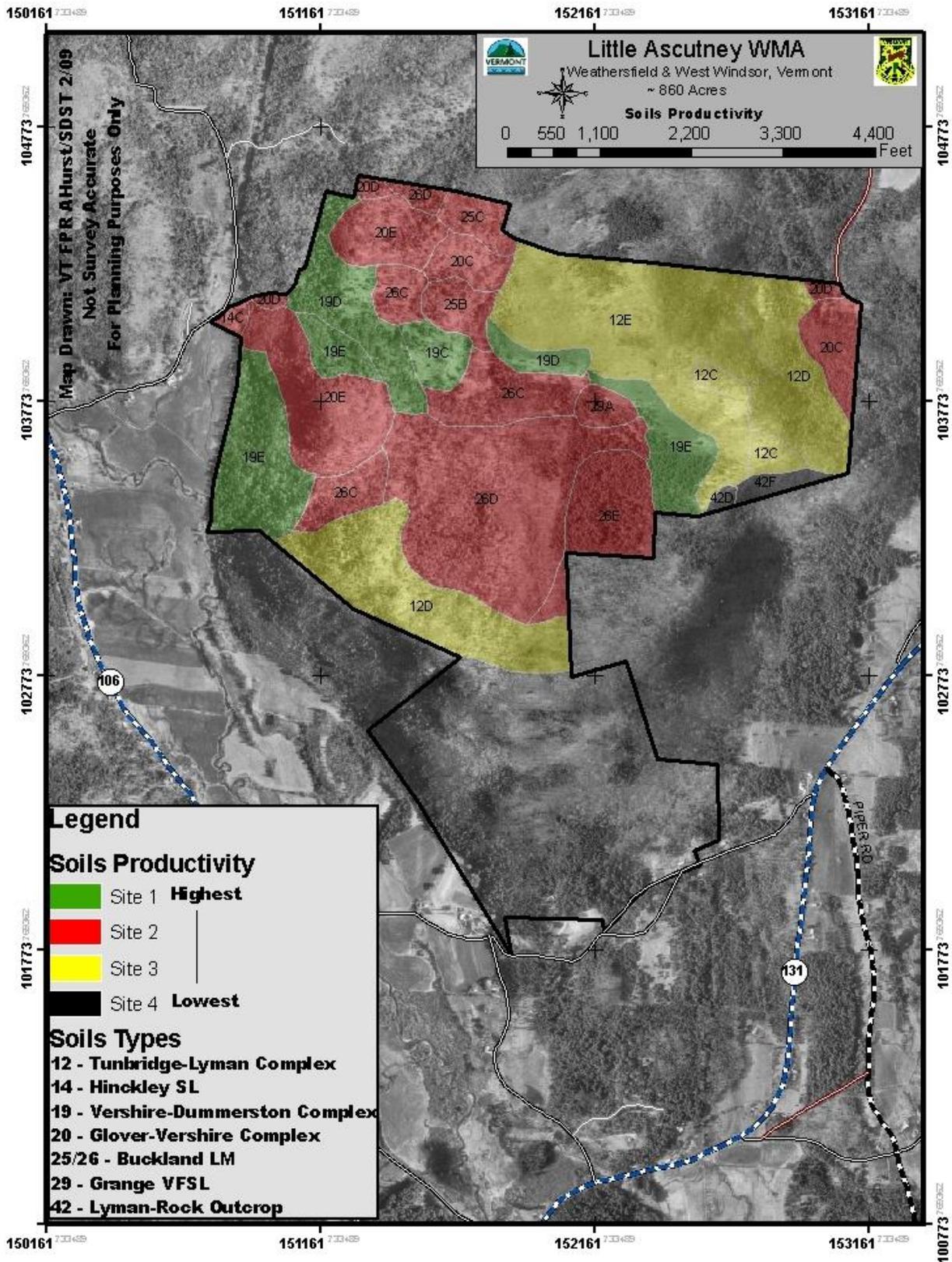


Figure 19: Mt. Ascutney State Park Forest Stands Map

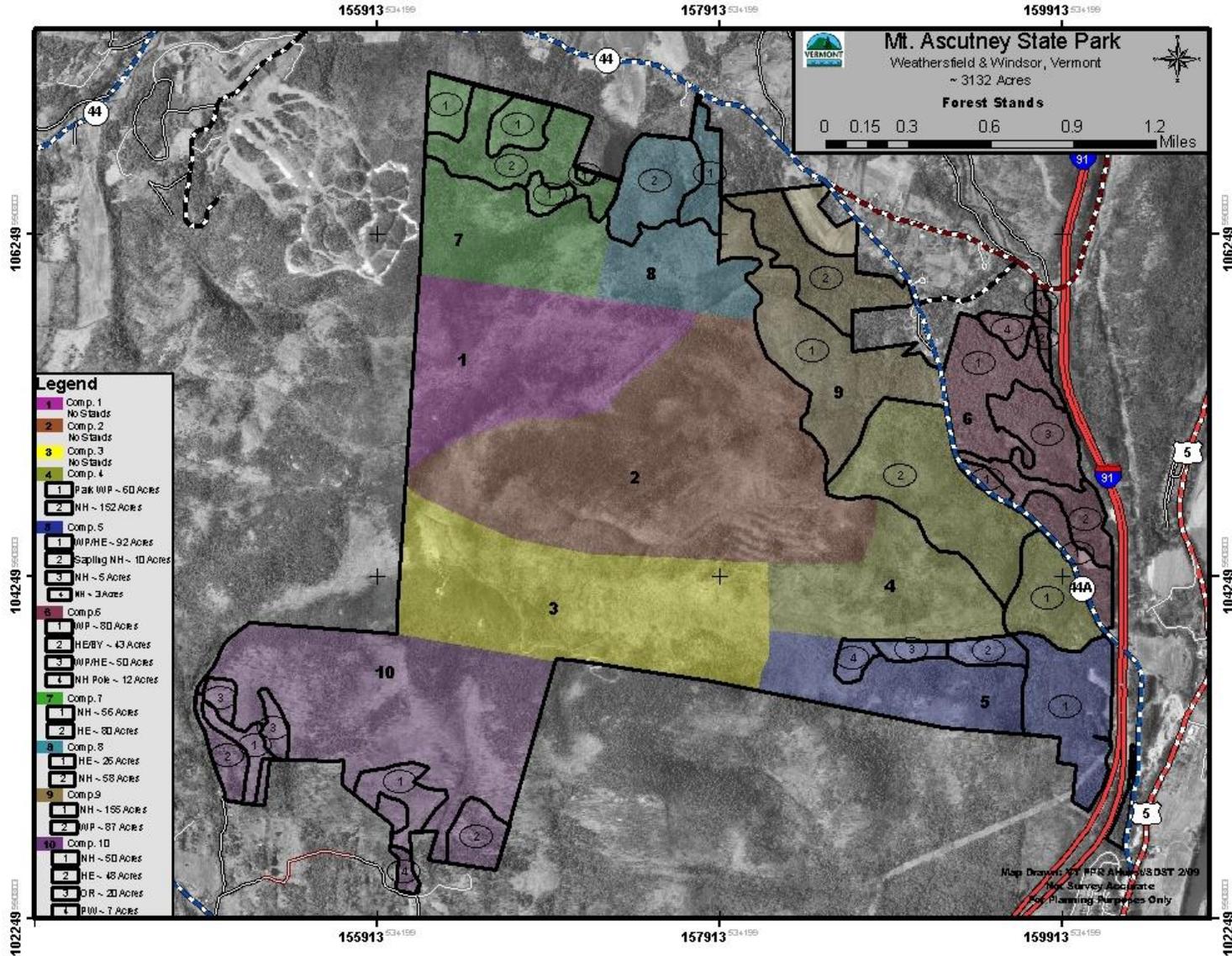
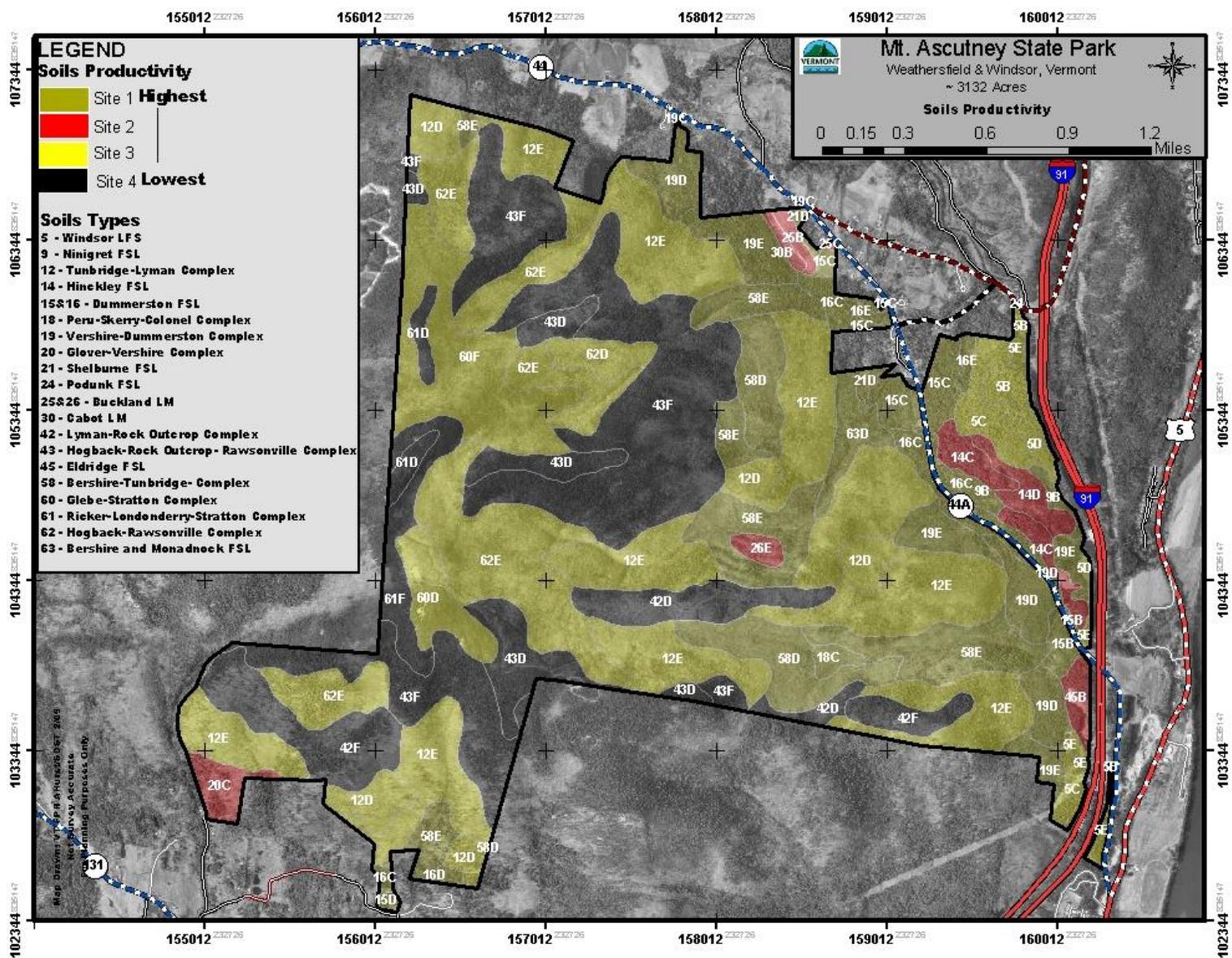


Figure 20: Mt. Ascutney State Park Soils Productivity Map



**Figure 21: Skitchewaug WMA Mountain Block Forest Stands Map**

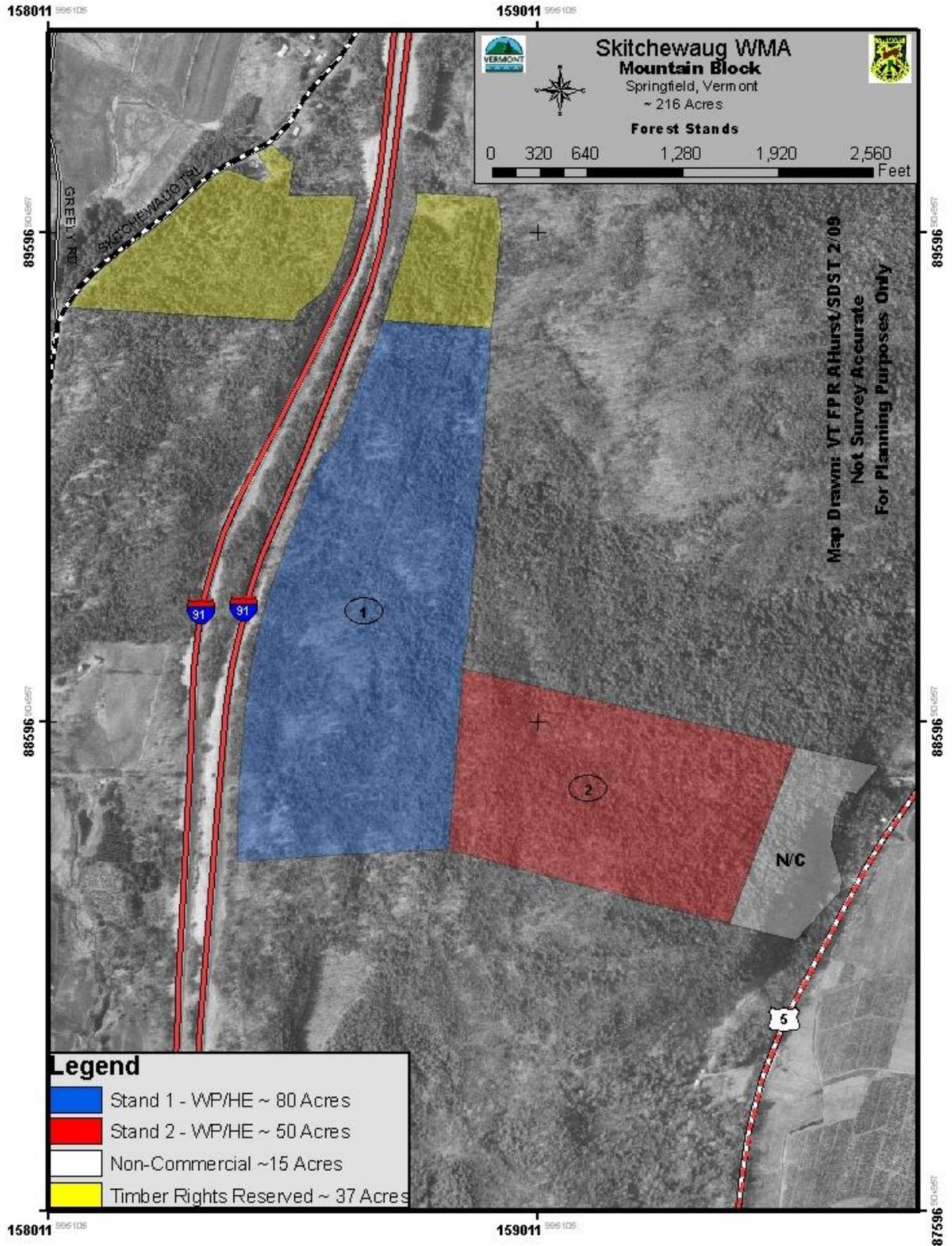
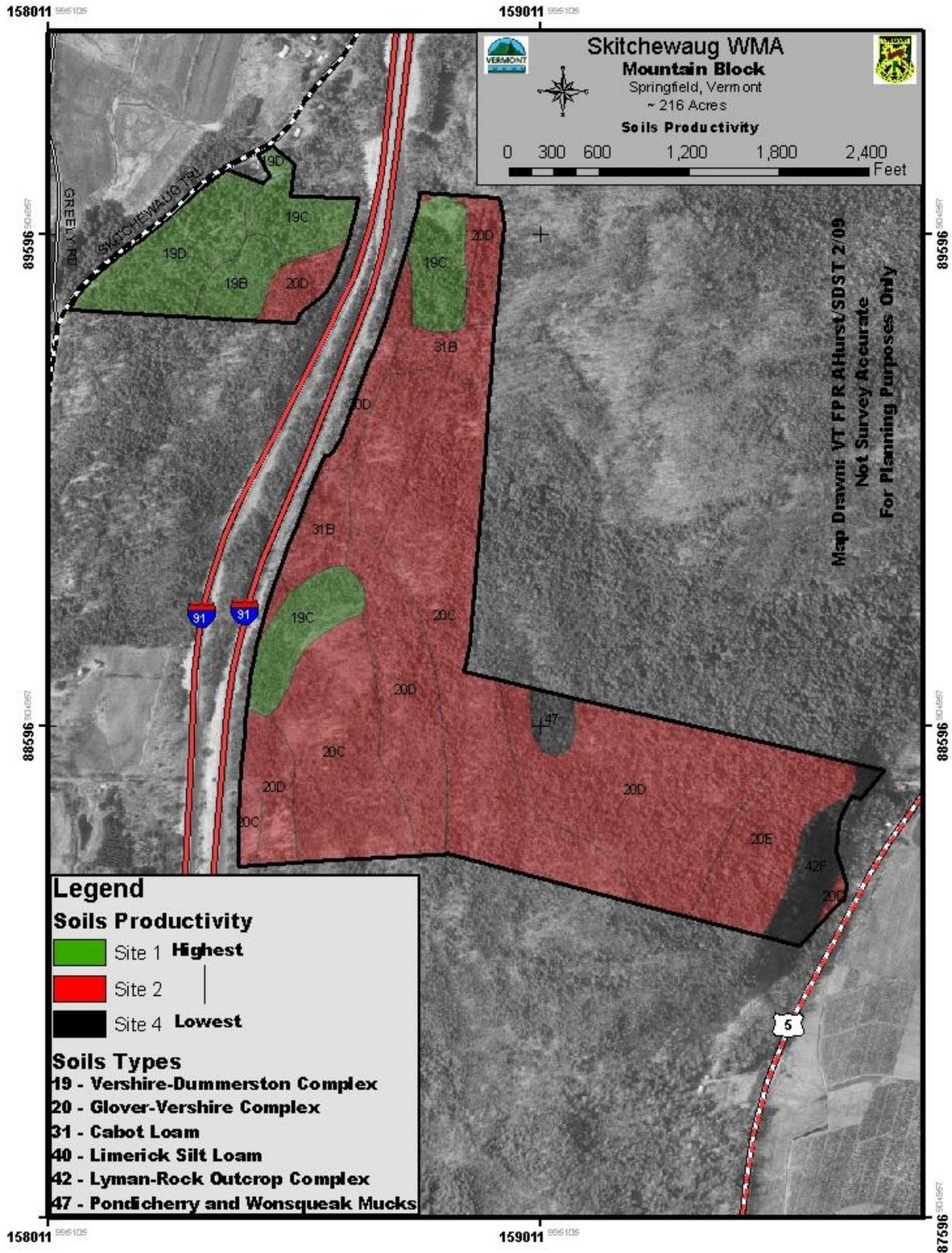


Figure 22: Skitchewaug WMA Mountain Block Soils Productivity Map



**Figure 23: Wilgus State Park Forest Stands Map**

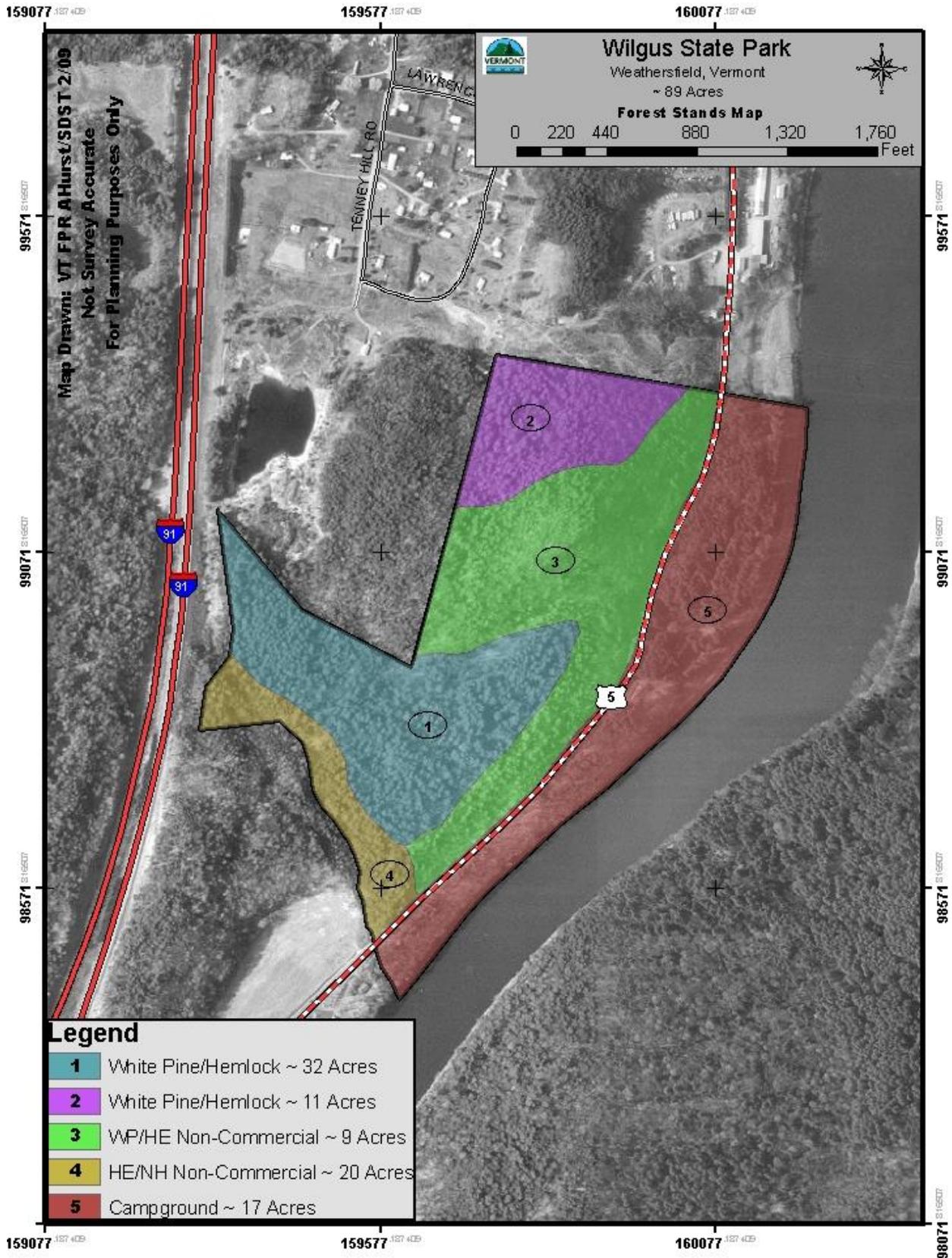
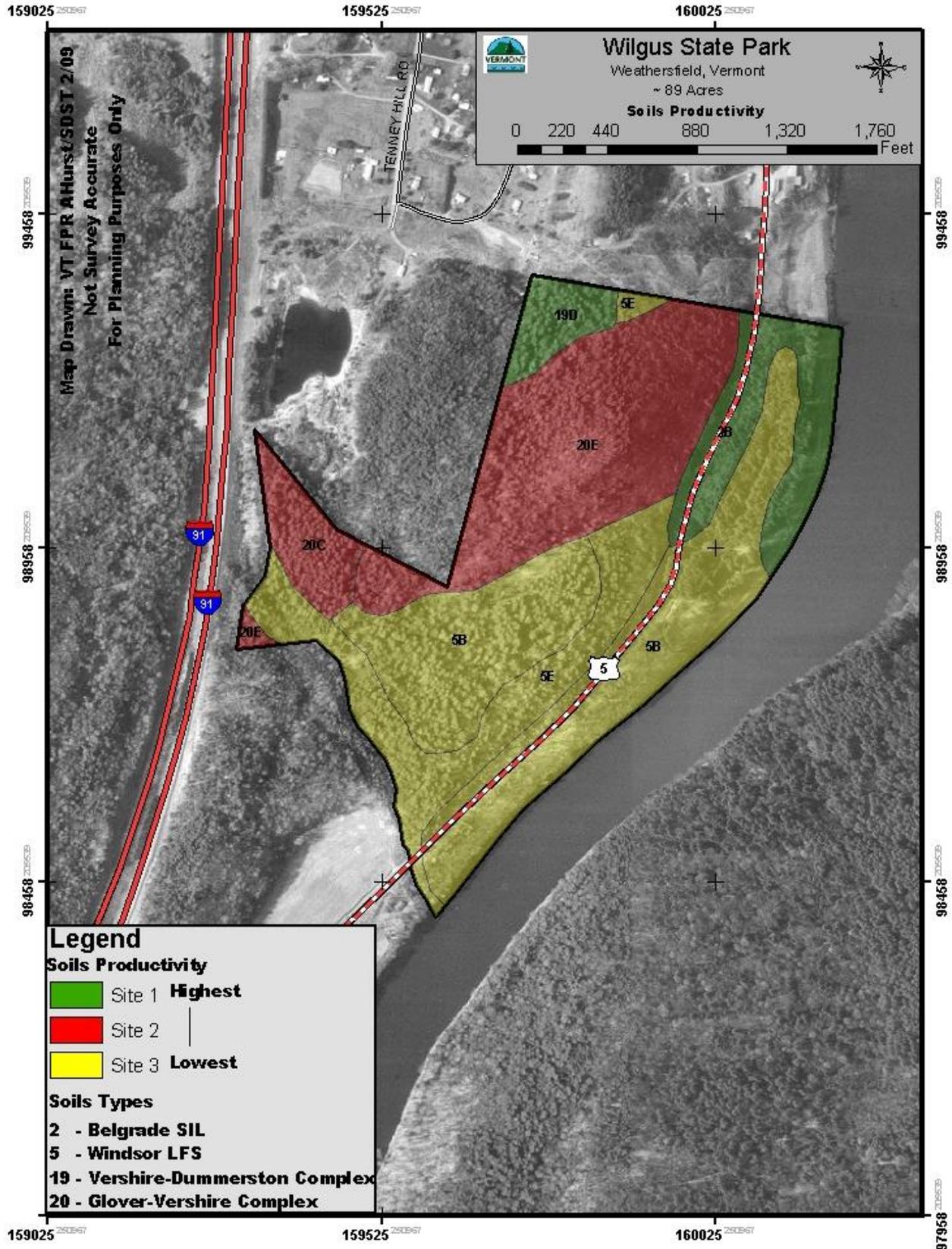


Figure 24: Wilgus State Park Soils Productivity Map



Forest Stand Information: **Ascutney Management Unit:** Mt. Ascutney State Park

Comp./ Stand	Acres	MSD	BA A Total/ Dom-codom.	Acc. BA/A	Unacc. BA/A	Cull BA/A	Site	Timber Type	Species % BA	Regeneration – Understory Condition	Recommended Treatment at time of inventory	Volume/ Acre
4/1	152	10.2	134/104	112	19	2		25 Beech-Birch-Maple	MS 25 HE 16 OR 15 HB 2.4	Inadequate with Be, stm, and HH competing.	Crop tree release poles—wildlife. Thin in pine/NH where accessible. Aspen patch cuts(s).	6.3 MBF 10.3 Cords
5/1	152	14.0	108/89	76	30	2		22 White Pine-Hemlock	PW 53 HE 13 MS 7.9	Pockets of He, Pw, BB. Abundant Be, Stm in places.	Thin white pine and release regeneration. Follow up OSR/90 w/CL and W.	8.2 MBF 11.7 Cords
5/2	10	4.6	89	54	35		2	25 Beech-Birch-Maple	BE 50 He 13 Stm 16	Poor – striped maple/beechn dense.	Previous overstory removal, TSI to release black birch.	1.3 MBF 6.6 Cords
5/3	5	10.8	106	70	36		2	25 Beech-Birch-Maple	MS 41 Be 33 BB 17	Poor – striped maple/beechn dense.	Re-evaluate in next planning period.	6.3 MBF 7.3 Cords
5/4	3	10.4	140	46	94		2	25 Beech-Birch-Maple	Be 28 MS 19 MR 19 OR 14	Poor – striped maple/beechn dense.	Re-evaluate in next planning period.	2.9 MBF
6/1	80	15.5	121/96	92	26	3		21 White Pine	PW 73 HE 14 BB 6	Variable density Pw, He, Be, Stm, BB. Honeysuckle present.	Group selection to release understory white pine. Invasive control. Apple tree release.	18.2 MBF 4.3 Cords

Comp./ Stand	Acres	MSD	BA A Total/ Dom-codom.	Acc. BA/A	Unacc. BA/A	Cull BA/A	Site	Timber Type	Species % BA	Regeneration – Understory Condition	Recommended Treatment at time of inventory	Volume/ Acre
6/2	43	12.3	170/135	142	12	15		24 Hemlock-Yellow Birch	HE 62 PW 12 OR 7	Limited regeneration.	Next treatment should be 2020. Portions are steep streambank.	10.5 MBF 11 Cords
6/3	50	9.5	116/110	92	16	8		22 White Pine-Hemlock	HE 41 PW 36 OR 7	Poor success w/striped maple and fern (wintering area).	Underplanting of white spruce.	4.9 MBF 5 Cords
6/4	12	pole	no data collected					Northern Hardwood w/mast	ASP, HE, OR, AW	Poor, heavily browsed.	Patch cut aspen. Crop tree release mast trees.	
7/1	56	12.8	108/96	78	8	22		25 Beech-Birch-Maple	MS 54 AW 15 BE 11	Inadequate, often Be, HH, Stm.	Group selection where accessible. Portions may be inoperable.	5.6 MBF 10 Cords
7/2	80	9.3	130/102	102	10	18		23 Eastern Hemlock	HE 54 SR 16 HR 9	Pockets of He and SR with BE, STM.	Group selection where accessible. Portions may be inoperable.	3.8 MBF 2 Cords
8/1	26	13.8	145/140	115	15	15		23 Eastern Hemlock	HE 79 BP 7	Spotty – some hemlock.	Thinning.	10 MBF 17 Cords
8/2	58	11.4	103/92	55	38	12		25 Beech-Birch- Maple	MS 47 AW 16 HH 14	Poor, generally striped maple, beech with some sugar maple.	Thinning.	3.1 MBF 7 Cords
9/1	155	10.5	99.3/77.9	63	24	11		25 Beech-Birch-Maple	MS 35 HE 22	Spotty to established HE	Thinning. Possibly exotic plant control.	3.5 MBF 9 Cords
9/2	87	11.2	104/98	78	6	20		21 White Pine	PW 56 HE 23	Establish OR, HI, BW, STM, AW, HM.	Regeneration release.	8.2 MBF 6 Cords
10/1	50	10.7	83/71	56	9	17		25 Beech-Birch-Maple	MS 62 PW 8 BE 8 OR 8	Spotty AW, BE, BW, STM, HH, PW.	Heavy browsing. Recently cut. In growth period.	2.7 MBF 9 Cords

Comp./ Stand	Acres	MSD	BA A Total/ Dom-codom.	Acc. BA/A	Unacc. BA/A	Cull BA/A	Site	Timber Type	Species % BA	Regeneration – Understory Condition	Recommended Treatment at time of inventory	Volume/ Acre
10/2	48	10.2	110/94	79	11	20		23 Eastern Hemlock	HE 33 MS 10 BE 9 or 7	As above, but with black birch.	Will need ROW. Portions need thinning.	4.5 MBF 9.5 Cords
10/3	20	10.0	80/63	50	6.7	6		55 Northern Red Oak	OR 42 MR 17 SR 12 MS 12	Inadequate.	None recommended.	2.7 MBF 4.7 Cords
10/4	7	14.0	125/115	75	—	50		21 White Pine	PW 84 HI, CB, HH 12	Established but browsed hardwood.	Heavy browsing and deer sign. Cull removal and mast tree release (with apples).	7.4 MBF 11 Cords

Date of Inventory: 2007

\* No data at Weathersfield WMA – timber owned by others.

Forest Stand Information: **Ascutney Management Unit:** Little Ascutney WMA

Comp./ Stand	Acres	MSD	BA A Total/ Dom-codom	Acc. BA/A	Unacc. BA/A	Cull BA/A	Site	Timber Type	Species % BA	Regeneration – Understory Condition	Recommended Treatment at time of inventory	Volume/ Acre
1	105	14.0	135/87	75	42	18		23 Eastern Hemlock	HE 49 MS 17 BE 14	Spotty Hw, By, Pw, Or competing with Be, HH, Stm	Release regeneration, mast trees and hemlock. Portions deer wintering area.	5.3 MBF 10 Cords
2	176	11.5	98/87	71	15	12		25 Beech-Birch-Maple	MS 58 BE 14 HE 8	Limited with areas of Be and Stm	Patch cuts in 2018. Heavy browsing pressure.	5.1 MBF 15 Cords
3	118	10.6	106/71	64	38	4		Northern Hardwood & Oak/HH	HH 23 MS 16 PW 16 OR 7 HE 6	Limited	Crop tree release for mast production.	3.1 MBF 6 Cords
4	174	12.5	156/144	44	66	45		21 White Pine	PW 67 HE 11	Abundant in places. Pw, He, BP, BY, AW, OR competing with Be and Stm	Single tree and group selection to release regeneration and crop trees. Portions deer wintering area.	7.6 MBF 17 Cords
5	44	12”+	30-100	0-60	n/a	n/a	1-3	26 Sugar Maple-Basswood	OR HC HE PW MS BA	Poor regeneration, heavily browsed	All data estimated. Scattered limited plots due to inoperability. Important mast area.	n/a

Date of Inventory: 2007

Forest Stand Information: **Ascutney Management Unit:** Skitchewaug WMA

<b>Comp./ Stand</b>	<b>Acres</b>	<b>MSD</b>	<b>BA A Total/ Dom-codom</b>	<b>Acc. BA/A</b>	<b>Unacc. BA/A</b>	<b>Cull BA/A</b>	<b>Site</b>	<b>Timber Type</b>	<b>Species % BA</b>	<b>Regeneration – Understory Condition</b>	<b>Recommended Treatment at time of inventory</b>	<b>Volume/ Acre</b>
1	80	13.1	137	78	59	—	2	22 White Pine-Hemlock	35 HE 14 MR 13 PW 16 Oaks	Scattered hemlock regeneration. Occasional barberry and honeysuckle	White pine salvage. Release of hemlock and mast trees.	7.2 MBF 15 Cords
2	50	13.2	125	89	36	—	2 & 3	22 White Pine-Hemlock	32 HE 23 PW 15 Oaks-Hickory	Scattered hemlock	Mast tree release. Browse production.	8.7 MBF 10 Cords

Date of Inventory: March 2008

Forest Stand Information: **Ascutney Management Unit:** Wilgus State Park

Comp./ Stand	Acres	MSD	BA A Total/ Dom-codom	Acc. BA/A	Unacc. BA/A	Cull BA/A	Site	Timber Type	Species % BA	Regeneration – Understory Condition	Recommended Treatment at time of inventory	Volume/ Acre
1	32	14.9	149/130	139	2	8	2	22 White Pine-Hemlock	PW 59 HE 16 OR 14	Limited black birch and hemlock	Thinning	19.6 MBF 7 Cords
2	11	15.1	158/85	125	32	—	2	22 White Pine-Hemlock	HE 52 PW 29 BB 13	Inadequate	Thin white pine	10.3 MBF 13 Cords
3	9	13.3	190/160	166	—	23	2	22 White Pine-Hemlock	HE 61 PW 28	Inadequate	Inoperable – none	18.1 MBF 11 Cords
4	20	13.4	166/126	144	19	4	2	24 Hemlock-Yellow Birch	HE 34 PW 22 OR 20	Inadequate	Steep with no obvious access	12 MBF 16 Cords

Date of Inventory: 2003

## **VI. Legal Constraints and Title History**

There are a number of legal constraints that affect the stewardship of the Ascutney Management Unit (AMU). They include: deed restrictions, funding conditions, conservation easements, and long-term leases and licenses. In order to assess the effects that these legal constraints have on implementation of a Long Range Management Plan (LRMP), it is important to understand the specific details of the different types of legal constraints that apply to the AMU.

AMU is comprised of a number of individual land parcels that have been acquired by the State of Vermont since 1933. These parcels were acquired by the Vermont Department of Forests, Parks and Recreation and Vermont Fish & Wildlife Department using a variety of funding sources or through individual donations. The source of funding initially used to acquire state land was by legislative appropriation. During the early years, parcels of land were purchased by the State with few restrictions other than those that historically ran with a property (i.e., spring rights, rights-of-way, etc.).

In subsequent years, the federal government passed legislation that provides states with additional sources of funding for acquisition of public land. Federal programs used to acquire some properties that make up the AMU are: the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act) and the Land and Water Conservation Fund (LWCF). These federal sources require the State to match a small amount of the cost of each acquisition. However, requirements for funding from these sources also stipulate that certain conditions be placed upon the management of properties purchased with the funds. This requirement, to some degree, impacts the types of uses permitted to occur within acquisitions that were federally funded in perpetuity.

In 1987, the Agency of Natural Resources (ANR) received another source of funding to purchase land. State funds were provided by the Vermont Housing and Conservation Board (VHCB). VHCB, a quasi-governmental board charged by the Vermont Legislature in 1987 for the dual goals of providing affordable housing and conservation lands with important resource values in Vermont. The legislature appropriates funds each year to support these goals. The VHCB requires all conservation projects they fund to be protected in perpetuity by legal instruments (conservation easements) recorded in the town land records, which travel with the land. Several parcels added to AMU were funded by the VHCB acquisition grants.

The Vermont ANR has also developed close partnerships and has worked cooperatively with many non-profit conservation organizations like the Vermont Land Trust, The Nature Conservancy, and the Upper Valley Land Trust who have assisted the ANR in acquiring several properties which were added to the AMU. On occasion, these organizations have helped to bridge important state acquisitions by acquiring a property and taking it off the market thus providing the ANR with more time to secure the necessary funding for acquisition. In most cases, the State has granted conservation easements for those properties to these private non-profit organizations for their involvement in the land transaction.

All of the conservation easements for individual properties that make up the AU require that the State develop a LRMP. Conservation easements usually don't regulate the type of forest

management activities that occur; however, they do address the types of development, signage, and the types of recreational activities that may occur such as non-motorized versus motorized recreation, commercial activities, etc. They also provide the public with the right of access and conditions under which access can be restricted. These conservation easements are monitored yearly by the organization holding the easement to insure compliance with the terms of the easement.

A small portion of the acreage within the AMU is under long-term lease to private companies. Leases are formal written authorizations for long-term activities that may allow the user (leasee) some interest in the land but does not transfer contractual, vested or property rights. Land under lease must be managed in conformance with the conditions of the original agreements.

The following is a summary of the major legal constraints that impact management and public use of AMU. More detailed information for all of the properties regarding these specific rights is available in the ANR Springfield regional office.

### **Summary of Major Legal Constraints**

#### *Little Ascutney WMA*

1) Vermont Housing and Conservation Board Grant Agreement (Atkinson-Davis Corporation and Spackman): In 1992 and 1993 the VHCB partially funded State acquisition of:

- The timber rights on the 396-acre Slayton Lot (partially owned by the Vermont Fish & Wildlife Department since 1959).
- The 53-acre Davis inholding parcel.
- The 207-acre Spackman property.

As a condition of accepting the funding, the Fish & Wildlife Department agreed to hold these acquisitions in public ownership as part of the Little Ascutney WMA solely for recreation, forestry, open space, and wildlife uses. The Department was required to submit a management plan to VCHB for review and also include the VHCB on any signs posted on the property indicating project sponsorship.

2) The deed for the Spackman property identifies a spring of water and a right-of-way to it was reserved for W. J. Oakes, his heirs or assigns. The specific location of the spring on the property is unknown.

3) Federal Aid in Wildlife Restoration Act (PR) (Pittman-Robertson Act): This Act, commonly called the Pittman-Robertson Wildlife Restoration Act, provides federal aid to the State for the management and restoration of wildlife. The federal aid, funded through an excise tax on sporting arms and ammunition, may be used to support a variety of wildlife projects including acquisition and improvements to wildlife habitat. These funds were used for the improvements made to the access road and parking area as well as the enhancements to wildlife habitat on the Little Ascutney WMA. Management activities and land uses on parcels funded with Pittman-Robertson funds must be consistent with the objectives of

protecting, restoring, or improving habitat for wildlife. Recreational activities may be restricted to those activities which meet these objectives.

- 4) CVPS leases a strip of land 100' wide and 100' long located near the main entrance to Little Ascutney WMA for construction and maintenance of an overhead electrical transmission line. State agrees not to erect any structures or to block access to this leased area.
- 5) CVPS and NE Telephone have an easement to install and maintain one stub guy installation that will support a pole carrying electric and telephone wire cables and fixtures. Pole is located along TH #6 near the main entrance to the WMA.
- 6) State Owned "Hunting Rights": The Vermont Fish & Wildlife Department purchased the hunting rights on 209 acres of land in the town of Weathersfield in 1964.

#### *Mt. Ascutney State Park*

- 1) Upper Valley Land Trust (UFLT) and Vermont Housing and Conservation Board (VHCB) Conservation Easements (Miller, Richards, Angeloff, and Dunbar) in Mt. Ascutney State Park – Approximately 796.8 acres of land owned in fee by the State of Vermont is subject to a perpetual conservation easement co-held by the Upper Valley Land Trust and the VHCB. The easement permits forest and wildlife management practices in accordance with an approved management plan, agricultural management practices, non-motorized dispersed recreation (including use of snowmobile trail), construction of trails, and other uses, in accordance with an approved management plan, but limits residential, industrial, and mining activities along with other activities that would conflict with the purposes of the grant.
- 2) Vermont Housing and Conservation Board Conservation Agreement (Bickford) in Mt. Ascutney State Park: Approximately 179.16 acres of land owned in fee by the State of Vermont is subject to a perpetual Conservation Agreement between the Vermont FP&R and the VHCB. The Conservation Agreements permits forest and wildlife management practices, agricultural management practices, recreational uses and other uses, construction of trails in accordance with an approved management plan but limits residual, commercial, industrial or mining activities.
- 3) LWCF Funding Agreement (Sullivan) in Mt. Ascutney State Park: Approximately 200 acres of land and a public access easement owned in fee by the State of Vermont is subject to a perpetual grant agreement with the LWCF. Created by Congress in 1964, the LWCF provides money to federal, state, and local governments to purchase land, water, and wetlands for the benefits of all Americans. The fund receives money mostly from fees paid by companies drilling offshore for oil and gas. Other funding sources include the sale of surplus federal real estate and taxes on motorboat fuel. Management activities and land uses must be consistent with the objectives of providing outdoor recreational opportunities along with other benefits including: clean water, wildlife habitat, scenic vistas, and protecting archaeological and historical sites.

- 4) Deed Restrictions (McClary), Mt. Ascutney State Park: Approximately 205 acres of land deeded to the State of Vermont is subject to certain deed restrictions held in perpetuity by The Nature Conservancy. The restrictions allow the property to be managed and maintained as a natural area for public use and enjoyment, and prohibits development except that which is required to provide sanitation, safety, control, and access for the public. Trailer camping is also prohibited in the deed.
- 5) South Peak Electronics Communication Site (Mt. Ascutney State Park): Located on the summit of Mount Ascutney South Peak in the Town of Windsor, the 3.3 acre site is owned in fee by the State of Vermont and leased to Vermont Public Television (VPT). The site contains a 380' guyed tower with associated communications equipment and a permanent building to house communication equipment. The tower is also used for other broadcast, cellular, and microwave antennas. The site is accessed by a spur road from an established parking area at the end of the Ascutney Mountain Access Road. The VPT site contains a number of commercial users who have co-located antennas and electronic communications equipment on the site.
- 6) North Peak Electronics Communications Site (Mt. Ascutney State Park): Located on the summit of Mt. Ascutney North Peak in the Town of Windsor, the site has an electronic building and two towers on .45 acres: the WNNE 110' self-supporting tower and the 75' self supporting tower owned by TransCanada Hydro Northeast. Various private, broadcast, industrial, governmental, and communications companies are also users of the WNNE tower and collectively belong to the Electronic Communications Association which also manages the site.
- 7) Hiking Trail Easements held by the State (Mt. Ascutney State Park): Four hiking trail easements owned by the State of Vermont in perpetuity to maintain access to Mt. Ascutney over the following trails:
  - a. Weathersfield Trail Easement – The State of Vermont holds a 100' hiking trail easement (50' on both sides of the trail) through 6,645' of the West Windsor Town Forest for the purpose of providing a public trail or footpath to the summit of Mount Ascutney.
  - b. Weathersfield Trail Easement – The State of Vermont holds a 25'x800' hiking trail easement over land belonging to Morgan and Ruth Adams in the Town of Weathersfield.
  - c. Brownsville Trail Easement – The State of Vermont holds a 100' hiking trail and trailhead access area easement over land belonging to Robert and Amy Sullivan for the purpose of locating and maintaining a hiking trail and trailhead parking.
  - d. Brownsville Trail Easement – Ascutney Mountain Resort agrees to establish a 100 foot wide buffer zone along the Brownsville Trail and around the former Norcross Quarry as a land use permit condition.

- 8) The State of Vermont holds a 50' right-of-way over land owned by the Mount Ascutney Ski Resort in West Windsor for the purpose of gaining access to the Sullivan parcel by foot or vehicle.
- 9) Vermont Electric Cooperative Company (VELCO) leases a 150' wide strip of land for the construction, maintenance, and operation of the Ascutney Windsor 115 KV transmission line with right to access that line over Mt. Ascutney State Park.
- 10) The State of Vermont possesses a right-of-way for the Mountain Road over the Wheeler Lot along the southern boundary line of the park to allow for continuous access to the summit parking area.
- 11) Central Vermont Public Service Company (CVPS) has a number of easements for pole lines for electrical transmission over Mt. Ascutney State Park land in the towns of Windsor and Weathersfield. Records on file in the ANR Springfield regional office.
- 12) Spring and water rights reserved by adjacent landowners over Mt. Ascutney State Park in the towns of Windsor and Weathersfield. These right predate the construction of I-91 and may no longer be valid. Records on file in the ANR Springfield regional office.
- 13) A perpetual easement for the purpose of constructing, erecting, repairing, and doing all the things necessary for sewer line purposes on the Miller property in the town of Windsor.
- 14) An agreement with the Ascutney Trails Association concerning hiking trail maintenance.
- 15) Any development on Mt. Ascutney State Park lands above 2500' elevation are required to submit an ACT250 permit application.
- 16) VT Department of Transportation has a deeded easement right on the McClary Lot to relocate, widen and maintain Mill Brook.
- 17) According to the 1993 LRMP a portion of the park is encumbered by a LWCF condition due to a 1971 water system maintenance project. No other information is available at this time. Further research is necessary as to what the encumbrance is and where it applies.
- 18) New England Telephone and Telegraph Company (NE T&T) and CVPS hold a line right-of-way across Mt. Ascutney State Park. This ROW predates the construction of I-91 so it is unknown if it is still active or has been dissolved.
- 19) The Vermont Hang Glider Association has a license to use the mountain road and two hang glider launch pads on the State Park.
- 20) The University of New Hampshire has a license to conduct scientific research on a portion of Mt. Ascutney State Park.

- 21) Land and Water Conservation Funds and Vermont Housing and Conservation Funds were used in the development of the Brownsville Trailhead. Certain restriction may apply to use and further development.
- 22) Land and Water Conservation Funds were used in the development of the Weathersfield Trailhead. Certain restriction may apply to use and further development.

#### *Skitchewaugh WMA*

- 1) Federal Aid in Wildlife Restoration Act (Pittman-Robertson Funding): Approximately 175 acres of land and a permanent right-of-way (through the Kendall property on US Route 5) owned in fee by the Vermont Fish & Wildlife Department.
- 2) Timber Rights Reserved: Approximately 43 acres of land acquired from Arthur Davis by the Vermont Fish & Wildlife Department in 1959 have the timber rights reserved.
- 3) New England Telephone and Telegraph Co.: Pole line easement recorded in Book 31 and 56, pages 381 and 77. It is not known whether this right-of-way is still used, but according to ANR Survey Section, an underground fiberoptic cable is buried along this right-of-way. Further research will be required as to who the current owner of the right-of-way is and if it is being used.

#### *Weathersfield WMA*

- 1) Timber Rights Reserved: Approximately 80 acres of land purchased from the Atkinson-Davis Corporation by the Vermont Fish & Wildlife Department with Pittman-Robertson funding have the timber rights reserved.

#### *Wilgus State Park*

- 1) Deed Restrictions in Wilgus State Park: The land deeded to the State of Vermont requires the State to: forever maintain and preserve the land as a “State Forest Park” to be kept open for recreational purposes and kept free of buildings and structures used for commercial purposes. The deed also prohibits towers or other structures and buildings on the hill called the “Pinnacle”.

## VII. Historical Resource Assessment and Maps (with Legal Constraints)

A detailed historical assessment of the Ascutney Management Unit (AMU) was prepared by staff from the Archaeology Research Center from the University of Maine at Farmington in 2008. Summary tables from this report listing the historic resources within or in close proximity to each of the five properties assessed are included in this plan.

Archaeological Precontact Site Sensitivity Assessments were conducted between 2003 to 2008 on portions of Mt. Ascutney State Park and Little Ascutney and Skitchewaug WMAs by the Consulting Archaeology Program (CAP) from the University of Vermont. CAP has also conducted site inspections at three locations within Mt. Ascutney State Park.

Other archaeological surveys conducted within the AMU include a site inspection of a proposed management activity within Little Ascutney WMA conducted in 1997 by the Archaeology Consulting Team, Inc. and a study of archaeological sensitivity within Vermont State Parks conducted in 1984-1986 for the Vermont Division for Historic Preservation and FP&R by Shelly Height.

### Native American Context

The five parcels comprising the AMU are primarily oriented along the Connecticut River, one of Vermont's principal north-south Native American travel corridors. Important east-west travel corridors such as the Black River also intersect the Connecticut River route within the management unit area. Early historic accounts in Vermont often describe the veneration for natural landforms by Native Americans making it possible that mountain peaks and other geological features within the AMU were of ideological importance to Native Americans. There are approximately 20 recorded Native American sites in the general vicinity of the AMU, most of them adjacent to the Connecticut River. One of the most important Native American sites identified in Vermont is located on the western banks of the Connecticut River approximately two miles south of Skitchewaug WMA. This Skitchewaug Site (VT-WN-41) is considered significant due to its excellent preservation and stratification of numerous occupation episodes over the last 3,500 years and because it documents the earliest known date for corn cultivation in New England, ca. 1100 A.D.

According to the report from UMaine, a limited amount of archaeological site work has been conducted in the AMU. The only recorded Native American site that has been identified within the AMU is site VT-WN-39, located in Wilgus State Park. This site was first reported by a local collector and is known primarily from two "fish spears" found by a former caretaker near the ranger's cabin. Very little is known about the site, and no professional archaeology has been conducted in the park. The effect of river bank erosion on potential cultural remains in Wilgus State Park is a serious concern cited in UMaine's report.

The only other Native American site known within the AMU with a high degree of confidence is a felsites (rhyolite) quarry site or multiple quarry sites located on Mount Ascutney near or within the southeast section of Mt. Ascutney State Park. Felsite is an igneous rock used by Native Americans for making tools. Exact site locations are unknown, but there is a high potential for

quarrying activity in this area. Native American stone tools and stone chips made of felsites quarried from Mount Ascutney have been recovered at a site several miles from the mountain. There is also the possibility of finding bedrock quarries and the quarry workshops associated with them within the Little Ascutney WMA and quarry sites and caves on Skitchewaug Mountain that may have been used by Native Americans.

UVM CAP sensitivity studies were conducted for Mt. Ascutney State Park and Little Ascutney and Skitchewaug WMA. One area of archaeological sensitivity was identified within Mt. Ascutney State Park. This sensitive area is located in the McClary Lot bounded by Route 44A on the west and I-91 on the east and contains a series of flat, elevated landforms and stream terraces likely dating to the retreat of the glaciers in the last ice age. Two sensitive areas were identified within Little Ascutney WMA. One area borders the North Branch of the Black River along the WMA's western, southern, and southeastern sides. The other sensitive area is located in the middle of the bowl between Pearson Peak and Little Ascutney Mountain along terraces on the north and south sides of a tributary of the Black River.

### Historic Euroamerican Context

European settlement in the vicinity of the AMU is believed to have started in the 1750s as settlers pushed northward from Massachusetts along the Connecticut River and its tributaries, especially the Black River. Settlement expanded rapidly after the conclusion of the French and Indian wars in the early 1760s. One of the earliest migratory routes used by settlers entering Vermont from New Hampshire and Massachusetts was the Crown Point Road. This road was constructed between 1759-1760 as supply line and military road between Fort No. 4 in Charlestown, NH and the British fortifications at Crown Point, NY. Research indicates that the Crown Point Road skirted around the southern end of Skitchewaug Mountain approximately 2 miles from Skitchewaug WMA.

### **Skitchewaug WMA**

The summit of Skitchewaug Mountain is located within the WMA and provides views of the surrounding area, including the Connecticut River to the east, the outlet of the Black River and Fort No. 4 in Charlestown, NH to the south, and Spencer Hollow, one of Springfield's earliest settled areas, to the west. Portions of the mountain are very steep and ledgy and may contain one or more caves. It is believed that the mountain was used as a refuge and lookout point by a group of "Tories" during the American Revolution and by a group of counterfeiter during the late 1700s and early 1800s.

According to the UMaine report, Daniel Gill built a log cabin in the 1770s on a hillside that may potentially be within or near the WMA. It is believed that Gill opened a small stone quarry on the property. Small amounts of iron ore and slate may also have been quarried at various locations within the WMA. The 1869 Beers map indicates the presence of a potential iron ore deposit in or near northern portions of the WMA.

Early maps indicate that the upper slopes of the mountain contained within the WMA were not inhabited by settler-farmers. However, farms in Spencer Hollow most likely managed the more accessible woodland on the western side of the mountain for wood and maple sugar production. It is believed that the western side of the WMA was cleared of trees in the 1830s for sheep grazing. Cattle were pastured on this portion of the mountain from the early 1900s to the early 1940s.

The acquisition history of Skitchewaung WMA is outlined in the management plan prepared by Kim Royar and Russell Reay in 1987 on file in the Springfield FP&R Office.

## **Wilgus State Park**

According to the UMaine report, the proximity of Wilgus State Park to the Village of Ascutney increases the general historical sensitivity of the park and the area surrounding it. Two regional roads of historical importance intersect in Ascutney. In the 1760s, settlers began work on a road that started in Ascutney along Mill Brook and eventually intersected with the Crown Point Road. This road, known in the early 1800s as the Weathersfield Turnpike, is in the general location of present day Route 131. Adding to the importance of this road was its connection to a crossing point on the Connecticut River for people traveling between Ascutney and Claremont, NH. Sumners ferry operated at this location in the early 1800s and in 1839, a wooden toll bridge was constructed over the river here by the Claremont Bridge Company.

The second historical road actually passes through Wilgus State Park and is the present day Route 5. Vermont Route 5 is located within an ancient Native American travel corridor that follows the Connecticut River. It is believed that a road was opened in this location during the late 1700s. It became the Connecticut River Turnpike in 1800 and remained a toll road until about 1840. Portions of Route 5 were relocated further away from the Connecticut River in the 1930s. The abandoned sections of the former Route 5 were turned over to the Town of Weathersfield and later discontinued. Major portions of this original Route 5 have eroded into the Connecticut River.

Historic maps indicate that Wilgus State Park may contain the archaeological remains of at least one farmstead dating to the 1850s or earlier. The western portion of the park may also contain the remains of old discontinued roads associated with the farmstead. According to the UMaine report, the farmstead and road resources may have been adversely affected by the construction of Wilgus State Park and Interstate 91.

Colonel William Wilgus purchased the land where the park is now located as farmland in 1922. In 1933 he donated 100 acres to the State stipulating that the property be named and managed as Wilgus State Park. Civilian Conservation Corps (CCC) crews from Mt. Ascutney State Park constructed the park between 1933 and 1935. Park structures and features built by the CCC that contribute to the historical significance of the park include the stone Ranger's quarters, 7 stone water fountains, 12 stone fireplaces, and the hiking trail to the Pinnacle. Wilgus State Park was included in the National Register of Historic Places in 2002 due to its CCC heritage.

Colonel Wilgus was an internationally famous civil engineer whose contributions to transportation, and specifically railroad engineering, are considered significant. Additional information regarding his life and achievements can be found in the Wilgus State Park management plan written by Diana Tanielian and Ray Harwood in 1984 and on file in the Springfield FP&R office.

The construction of Interstate 91 through Wilgus State Park during the 1960s resulted in the separation of a 10-acre portion of the park. This 10 acre-landlocked parcel was declared surplus property and sold in 1987.

### **Little Ascutney WMA**

Two historic farm sites are located in Little Ascutney WMA within the bowl between Pearson Peak and Little Ascutney Mountain. Dotan's 1856 Windsor County map identifies these former farm sites as owned by A. Streeter and J. Sherwin. In 1998, F&W contracted an archaeologist to conduct a site inspection of an apple tree release project planned for the area around the farmsteads. State site numbers VT-WN-240 and VT-WN-241 were assigned to the sites as a result of the inspection. It is believed that the farms were abandoned in the late 1800s or early 1900s, although some of the fields associated with the farms were maintained by local farmers until the 1970s. The sites contain cellar holes, stone foundations, and stone walls. A portion of the former road providing access to the farms is still visible as a dugway road with stone walls along both sides.

Little Ascutney WMA was established in 1959 when the State of Vermont purchased 396 acres from the Atkinson-Davis Corporation with the corporation retaining the timber rights to the property. In the early 1990s, several additions were made to the Little Ascutney WMA as part of the "Ascutney Basin Project" – a cooperative effort between the Vermont Departments of F&W and FP&R, the Vermont Housing and Conservation Board, and the Towns of Weathersfield and West Windsor to conserve undeveloped lands within the towns and link areas of public lands. In 1992, a 53-acre inholding within Little Ascutney WMA was acquired, and in 1993 the 207-acre Spackman property and the timber rights to the original 396-acre purchase from Atkinson-Davis were acquired. Additional acquisition details are available in the management plan for Little Ascutney WMA written in 1995 and on file in the Springfield FP&R Office.

### **Weathersfield WMA**

A major portion of the southern boundary of the Weathersfield WMA is along Roberts Road, a town road the easternmost section of which is discontinued. Historically, Roberts Road was a cross road connecting Route 5 with a now-discontinued town road that connected Weathersfield Bow with Weathersfield Center. According to the UMaine report, this other discontinued road provided an important connection with the town center to the town's most productive farming district and also provided access to the ferry crossing at the Weathersfield Bow that led to Claremont, NH.

Historic maps locate two former farms close to the WMA boundaries during the mid 1800s. The Shelden farm was located at the southwestern corner of the WMA and the Tolles farm was located at the eastern end of Roberts Road near its junction with Route 5. In both cases, the actual farm building sites are located outside of the WMA boundaries. Stone walls from the Shelden farm are found along the WMA boundary and within the WMA. According to the UMaine report, the proximity of the Tolles farm to the road junctions and to the WMA suggests the potential for historic resources related to the farm within the WMA.

Also according to the UMaine report, the WMA's proximity to the Connecticut River, an important log driving river, suggests the potential for logging camp(s) and related features within the WMA.

The Weathersfield WMA was established in 1959 when the State of Vermont purchased the 85-acre "Lockwood Lot" from Atkinson-Davis Corporation with the corporation retaining the timber rights to the property. Five acres of the WMA were transferred in 1963 by executive order from F&W to the State Highway Board for the construction of Interstate 91.

### **Mt. Ascutney State Park**

Historic Euroamerican resources which may be expected within or in close proximity of Mt. Ascutney State Park include those related to logging and lumbering, quarrying, and agriculture.

Boundaries on the north and east side of Mt. Ascutney State Park along Route 44 and 44A do not appear to contain any former historic homestead sites. However, park boundaries do approach Mill Brook and the outskirts of a small rural neighborhood that in the 1860s contained a schoolhouse, several farm/dwellings, and two sawmills. According to the UMaine report, only one structure identified on historic maps clearly falls within the boundaries of the park. The 1869 Beers map identifies a structure with the initials "E.G.L." on Route 44A. Because only the initials of the occupant are given, UMaine inferred that the structure/parcel represents a secondary holding of an individual or company. An attempt to identify the function and name of the owner was not successful, however its location on Route 44A suggests a logging and lumbering or agricultural context.

Boundaries on the southwestern portion of the park extend down slope near the vicinity of Mill Brook and Route 131, with a narrow section extending to South Mountain Road near its intersection with Cascade Falls Road. Settlement in this portion of Weathersfield began in 1763 when Benjamin Allen opened a road up Mill Brook from Ascutney Village in the general location of present day Route 131 and settled on this road near the mountain. Historic maps document farms, water-powered mills, a blacksmith shop, school, and several dwellings on Route 131 in the near vicinity of the Weathersfield section of Mt. Ascutney State Park. Nineteenth century maps and the "1883-84 Child's Gazetteer" indicate that several sheep farms were located along the present day location of the Cascade Falls and South Mountain Roads. No historic homestead sites appear to be contained within this section of the park. In cases where farms are found in the near vicinity of the park, resources such as stone walls, fence lines,

orchards, sugar maple stands, sap houses/sugar arches, sheep pasture, farm dumps, and other features of nineteenth century farms can be expected to be identified within the park.

### Logging

According to the UMaine report, logging and lumbering on Ascutney Mountain did not happen on a large scale until spruce had become the wood of choice for building purposes following the depletion of white pine in the mid 1800s. The remains of several old logging camps and a steam donkey are located within the park. The steam donkey and one logging camp are located near each other along the Futures Trail. Artifacts found at this old camp include cast iron stove parts, pieces of leather boots, bottle glass, and other items typical of post-1860 logging camps. A steam donkey is a steam-powered cable logging machine used to harvest timber on very steep terrain. The steam donkey marks a late nineteenth-early century logging technology and helps date a more recent logging camp, or the later phase of a previously established camp. The 1985 Division of Historic Preservation report by Shelly Height suggests that the stream donkey was used by a cable logging crew in the 1930s and that the CCC salvaged spruce on the mountain following the 1938 hurricane. It is possible that the camp and the steam donkey are related to this work.

Other logging camps are expected to have been located within the park; however factors such as excessive slope, poor timber quality, lack of water, and poor road access limit the number of sites where camps, especially 19<sup>th</sup> century camps, could be located. According to the 1992 edition of the Ascutney Trails Association guide book, the Chase and Carpenter Co. operated a logging camp at Halfway Spring. The 1981 ATA Guidebook contains a picture of the C&C logger's cabin taken in 1927. Access to this camp was provided by a road that was grubbed out in 1858 and roughly follows the course of the present day Windsor Trail. A map of Mt. Ascutney State Park prepared by Perry Merrill in 1937 shows the location of an "old sawmill" and a network of old logging roads high on the mountain. The locations of the sawmill and the C&C logging camp have not been confirmed on the ground.

### Quarrying

There are four known granite or syenite quarries on the mountain. The Tyler quarry is located outside the park boundaries on the southeastern side of the mountain. This quarry possibly represents the earliest known Euroamerican quarry on the mountain as it began producing grist mill stones in 1770 and continued in the nineteenth century providing stone and blocks for road and building construction. The Mower quarry is also located outside the park boundaries in the West Windsor Town Forest. This quarry opened in 1906 and was abandoned by 1923.

Two quarries are located within the park. The Enright quarry is located on the southern end of the Miller property that was acquired by the State in 2000. This site contains old haul roads, waste granite piles, and granite blocks, and ledges with drill marks on them.

A major portion of the Norcross quarry is also located on state land. This quarry is found along the Brownsville Trail straddling the West Windsor/Windsor town line. The Windsor Green Granite Company of Worcester, MA operated this quarry on an occasional basis beginning near

the turn of the century and abandoned it by 1923. In 1909 the quarry measured about 200' x 40' with a ledge and working face of 80-90' above the quarry bottom. Three derricks, a hoisting machine, and steam drill were used in the operation. A boarding house was built at the quarry and a blacksmith shop with barn and stable were located lower down the mountain. The site currently contains huge piles of waste granite, the remains of derrick booms or spar poles, rusty steel cables, and assorted hardware.

The 1.1 mile access road to the Norcross quarry is also considered an important secondary feature of the quarry operation. This road was built to the quarry over extremely steep ledgy terrain using horse and ox power, black powder explosives, and pick axes and shovels. A 1901 map also shows an old quarry site at the ledges where Mountain Brook crosses the quarry road, suggesting that quarrying activity was probably more extensive than represented on existing maps.

Additional information regarding the Norcross quarry can be found in the land management plan for Mt. Ascutney State Park revised in 1993 by the Springfield office staff and available in the Springfield FP&R Office.

### Civilian Conservation Corps

A CCC camp was established within Mt. Ascutney State Park in 1933. This camp was located south of the campground entrance in the area now used as campsites 19-39. Construction projects completed by the CCC within Ascutney include the mountain road, the park campground complex with features such as the stone ranger's house, stone fireplaces, tent platforms, stone water fountains, stone toilet buildings and stone picnic shelter, a 30-meter ski jump, the summit hiking trails, and the fire tower. CCC crews from the Ascutney camp also constructed the campground at Wilgus State Park. This CCC camp was closed and moved to Okemo State Forest in 1938. The state administration building is the only original CCC building from this camp still standing; the others were dismantled after the camp closed. A stone chimney standing above campsite #20 is all that remains of the officer's quarters.

Mt. Ascutney State Park was included in the National Register of Historic Places in 2002 due to its CCC heritage.

Additional information regarding this CCC camp can be found in the 1993 land management plan for Mt. Ascutney State Park available in the Springfield FP&R office.

### Hiking Trails

According to the 1992 edition of the Ascutney Trails Association guidebook, Mt. Ascutney was the first American mountain to have a "proper" hiking trail. The ATA claims that a trail was laid out in 1825 to the summit in preparation for a visit by General Lafayette, who was on a tour of the states. The ATA guide cites a local newspaper on June 6, 1825, calling for a community effort to build a road to the summit good enough for the wheeled vehicle transporting the general. The news item reports that a "comfortably furnished house" near the summit, most likely a former logging camp, was prepared to host lodgers. Unfortunately, Lafayette's visit in

Vermont was shortened and his trip to Ascutney Mountain was canceled. No map exists of this trail location and no evidence remains of this summit house.

In 1858 volunteers built a carriage road/trail largely along the route of the present day Windsor Trail under the direction of D.C. Linsley. They also constructed a stone hut, known as the Tiptop House, on the summit near Brownsville Rock. According to the ATA guidebook, the trail was originally known as the Dudley Trail for the reason that Windsor farmer A. Dudley operated a hotel called the "Mountain House" located at the base of the mountain that featured use of this hiking trail and the stone hut. The foundation stones for the stone hut can still be seen along the Windsor Trail near Brownsville Rock.

The Brownsville Trail was built in 1898 as an alternative route to the summit. In 1903, the Ascutney Mountain Association was formed to maintain the trails and stone hut. That year, the association rebuilt and partially relocated the Windsor Trail and restored and equipped the stone hut with a wood stove. In 1906 the association constructed the Weathersfield Trail. This group remained active until 1917 during which time annual Labor Day picnics were held on the summit attracting crowds of several hundred people each year.

According to the ATA guidebook, these early ventures in trail building and outdoor recreation are reported to have been the inspiration for establishing the Green Mountain Club and the Long Trail in 1910. Because of this, the UMaine report considers the Windsor, Brownsville, and Weathersfield trails and the features and structures associated with them as historically significant in the context of early outdoor recreation in Vermont.

With the Ascutney Mountain Association no longer active, the stone hut fell into disrepair and was no longer usable by 1925. The construction of the mountain reduced hiker traffic drastically and damage from the 1938 hurricane essentially closed the hiking trails. Little work was done on the trails until 1967 when the Ascutney Trails Association was formed.

An open face log shelter with an inside fireplace was built on the Windsor Trail by ATA members in 1968. The shelter had a metal roof, walls built of peeled spruce logs cut on site, and a dirt floor. In 2005, ATA member Crofter Cummings spent several days working on the shelter replacing rotting logs and building a wooden floor.

### Fire Tower

The summit of Mount Ascutney was at one time part of the Vermont fire lookout system. According to the ATA guidebook, a fire lookout ranger's cabin was constructed out of logs at the upper junction of the slot and slab trails in 1920. By 1945, the cabin was in disrepair and no longer usable; no trace of it exists today. CCC crews constructed a steel tower fire lookout tower in 1938-40. This tower was manned until 1952 when it was classified as an inactive secondary station for use only in emergency situations. In 1987 the tower was dismantled and the two lower sections used to construct an observation platform approximately 350' north of the tower's original location.

### Acquisition History

Mt. Ascutney State Park was established in 1933; the most recent land acquisition occurred in 2003. More information regarding the acquisition history of the park can be found in the 1993 LRMP for Mt. Ascutney State Park and in the 2001 Interim Stewardship Plans for the Sullivan, Bickford, Richards, Angeloff, and Dunbar properties and the 2000 Interim Plan for the Miller Estate, all available in the Springfield FP&R office.

Historic Resources Within or in Close Proximity to the Ascutney Management Unit.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
Windsor Co., Windsor, Weathersfield – Mt. Ascutney State Park	K	Historic park/CCC	Culture and Government, Tourism	The New Deal-CCC, 1933-1938	Motor road, picnic shelter, campsites/stone fireplaces, water fountains, stone toilet buildings, recreation hall, CCC camp, ski jump, fire tower, dam, quarrying sites, potential temporary work camps and misc. structures.	CCC camp dismantled and moved - standing chimney, administration bldg and buried cement bldg slabs remain in present camping area sites, 19-39. Granite culverts are notable features of motor road. Fire tower replaces 1920 wood-constructed tower.	High Priority – CCC built structures and features are eligible for inclusion in the National Register's, Historic Park Landscapes in National and State Parks multiple cover. Field documentation of the dam, quarrying sites, potential logging/work camps and other CCC-related resources not included in the NRHP document is recommended. Field inspection, documentation and assignment of state site numbers is recommended.
	K	Historic hiking trails, structures and features	Tourism	Outdoor Recreation	1825 summit house and trail; 1857 Dudley Trail (Windsor Trail) and stone hut; 1898 Brownsville Trail; 1906 Weathersfield Trail	System of trails and structures are potentially resources associated with logging and lumbering on the mountain. Dudley Trail originated at the Mountain House (A. Dudley farm) on Vermont Route 44.	High Priority – 1825 trail popularly referred to as first 'proper' hiking trail on an American mountain and inspiration of the formation of the Green Mountain Club and the Long Trail. Survey of old trail alignments for associated features (markers, bridges, stone steps, etc.) and location and archaeological assessment of former building sites recommended.
	K	Logging camp(s) and associated structures and features	Industry and Commerce	Logging and Lumbering	Logging camps (structural remains), dumps, log slide(s), steam donkey, steam powered sawmill, tote and haul roads, potential cribbed landings and other constructions.	Cast iron stove parts, leather boots, bottle glass identify one logging camp site, others are likely identifiable. Summit house sites(s) and later structures associated with hiking trails may have related logging contexts.	High Priority – Field inspection, documentation and assignment of state site numbers is recommended should logging camp, sawmill, log slide or other significant logging resource be identified in the field.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
<b>Windsor Co., Windsor, Weathersfield – Mt. Ascutney State Park (cont.)</b>	K	Quarries	Industry and Commerce	Norcross and Enright quarries	Quarry (containing remains of derrick booms, cable, waste piles, among other related resources), boarding house, access roads and related features.	Euro-American quarrying on Mount Ascutney dates to the 18 <sup>th</sup> century. Location of Enright quarry has not been field verified. Norcross quarry abandoned in 1923. CCC quarried granite for park construction.	High Priority – Field inspection, documentation and assignment of state site numbers is recommended for quarries identified in the field. All areas of known or expected quarry activity should be ground-truthed and a detailed sketch map showing the location of quarry openings, machinery, dumps, roads, together with photographic documentation should be a long-term preservation goal.
	E	Historic Upland farm-related resources	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875)	Known and potential agricultural resources to include stone walls, fence lines, orchards, sugar maple groves, sugar houses/arches, farm roads, dumps, discarded machinery.	Selected areas along routes 44A, 44 in Windsor and the Cascade Falls and South Mountain roads in Weathersfield are potentially sensitive for these resources.	Moderate Priority – Field inspection of areas within the park adjacent to or possibly including portions of nineteenth century farms is recommended. A structure identified on the Beers map as “E.G.L.”, located on Route 44A and likely within park boundaries should receive further investigation.
<b>Windsor Co., Weathersfield, West Windsor – Little Ascutney WMA</b>	K	19 <sup>th</sup> century Upland farmsteads	Agriculture	Diversified and Specialty Agriculture (mid 19 <sup>th</sup> century)	Cell hole/foundation remains (2 farmsteads), well (2), stone walls, orchard, sugar house.	Vicinity of two farmsteads known as the “Great Bowl”. VT-WN-240 identifies the Streeter (Kendall) farm, VT-WN-241 identifies the Sherwin farm. Sugar house may be related to nearby Slayton farm.	High Priority – Background research, additional field investigation and extension of 20-ft buffer to reflect former farm building complex rather than just the cellar holes is recommended as a long term preservation goal and prior to proposed subsurface ground disturbance.
	K	Historic road	Transportation	Overland Transportation	Road segment, road bed, and other potential features.	Described in 20 <sup>th</sup> century deeds as, “the old abandoned highway”. Access road into the Great Bowl and Streeter and Sherwin farmsteads. Existing stone wall may be an associated feature.	Moderate Priority – Field inspection and documentation recommended.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
<b>Windsor Co., Weathersfield, West Windsor – Little Ascutney WMA (cont.)</b>	E	Logging Camp(s) and associated structures and features	Industry and Commerce	Logging and Lumbering	Logging camps (structural remains), dumps, tote and haul roads, potential cribbed landings and other constructions.	No resources have been identified on maps or in the documentary record reviewed for this study.	Moderate Priority – Field inspection, documentation and assignment of state site numbers is recommended should logging camp or other significant logging resource be identified in the field.
	E	Historic Upland farm related resources	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875)	Known and potential agricultural resources to include stone walls, fence lines, orchards, sugar maple groves, sugar houses/arches, farm roads, dumps, discarded machinery.	Selected areas along Little Ascutney and Ascutney Notch roads are potentially sensitive for these resources. Stone walls identified in both areas associated with nearby farms.	Moderate Priority – Field inspection of areas within the park adjacent to or possibly including portions of nineteenth century farms is recommended.
<b>Windsor Co., Weathersfield – Wilgus State Park</b>	K	Historic park/CCC	Culture and Government, Tourism	The New Deal-CCC, 1933-1938	Ranger's Quarters, 12 stone fireplaces.	Company No. 129 from Mt. Ascutney State Park constructed Wilgus State Park 1935-1936.	High Priority – CCC built structures and features are eligible for inclusion in the National Register's, Historic Park Landscapes in National and State Parks multiple cover. It has been suggested that the Hitchcock farmhouse may have been located on the site of the present Ranger's Quarters. An architectural assessment is recommended to determine whether components of the 19 <sup>th</sup> century farmstead were incorporated into the construction of the Ranger's Quarters.
	K	Historic road	Transportation	Overland Transportation	Segment of abandoned section of Vermont Route 5, together with potential abutments, culverts, markers and other related features.	U.S. Route 5 relinquished and returned to Town of Weathersfield in 1937 and since discontinued as Town Highway. Major portion of road eroded into Connecticut River.	Moderate Priority – Field inspection and documentation recommended.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
<b>Windsor Co., Weathersfield – Wilgus State Park (cont.)</b>	E	19 <sup>th</sup> century Connecticut Valley farmstead	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875)	Potential agricultural resources include a subsurface remains of nineteenth century farmhouse, outbuildings, well, and secondary farm features such as stone walls, fence lines, orchard, sugar maple, groves, sugar houses/ arches, farm roads, dumps, discarded machinery.	1869 Beers map indicates the “I. Hitchcock” farm within or in the immediate vicinity of the park.	High Priority – Background research and additional field investigation, including subsurface testing recommended as a long term preservation goal and prior to proposed subsurface ground disturbance.
	E	Historic Upland farm related resources	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875)	Potential agricultural resources include stone walls, fence lines, orchards, sugar maple groves, sugar house /arches, farm roads, dumps, discarded machinery.	In western portions of the park, historic maps indicate the “R. Haskall” farm in the near vicinity of park boundaries.	Moderate Priority – Field inspection and documentation recommended.
	E	Historic road	Transportation	Overland Transportation	Segments of abandoned sections of two intersecting roads potentially extant in western portion of park, in the vicinity of the former H. Haskall farm, together with potential abutments, culverts, markers and other related features.	Map comparison shows that both roads were discontinued by 1869. Construction of Interstate 91 may have eliminated evidence of these features.	Moderate Priority – Field inspection and documentation recommendation.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
<b>Windsor Co., Weathersfield – Wilgus State Park (cont.)</b>	E	Logging Camp(s) and associated structures and features	Industry and Commerce	Logging and Lumbering	Logging camps (structural remains), dumps, tote and haul roads, potential cribbed landings and other constructions.	No resources have been identified on maps or in the documentary record reviewed for this study.	Moderate Priority – Field inspection, documentation and assignment of state site numbers is recommended should logging camp or other significant logging resource be identified in the field.
<b>Windsor Co., Weathersfield – Weathersfield WMA</b>	E	Historic Upland farm related resources	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875)	Known and potential agricultural resources include stone walls, fence lines, orchards, sugar maple groves, sugar houses/arches, farm roads, dumps, discarded machinery.	Historic maps indicate the “Sheldon” farm near the southwest corner of the WMA and the “F. Tolles” farm near the southeast corner of the WMA. Stone walls and fence line are present w/in the WMA in the vicinity of the Sheldon farm and along northern and western boundaries of the WMA.	Moderate Priority – Field inspection and documentation of stone walls bordering and within the WMA is recommended.
	K	Historic road	Transportation	Overland Transportation	Road segment, road bed, other potential features.	Roberts Road, on which the Sheldon and Tolles farm sites are located, a through road to Vermont Route 5 until, ca. 1953.	High Priority – Field inspection and documentation recommended. Junction of discontinued section of Roberts Road and Vermont Route 5 indicates the potential for unrecorded historic resources within or in close proximity to the WMA.
	E	Logging Camp(s) and associated structures and features	Industry and Commerce	Logging and Lumbering	Logging camps (structural remains), dumps, tote and haul roads, potential cribbed landings and other constructions.	No resources have been identified on maps or in the documentary record reviewed for this study.	Moderate Priority – Field inspection, documentation and assignment of state site numbers is recommended should logging camp or other significant logging resource be identified in the field.

County, Town, State Park/WMA	Known or Expected	Historic Resources	Preservation Theme	Historic Context	Property Types	Comments	Significance/ Recommendations
<b>Windsor Co., Springfield, Skitchewaug WMA</b>	E	18 <sup>th</sup> century farmstead	Agriculture	Diversified subsistence farm	Cellar hole/foundation remains, well, outbuildings, stone walls/fence line, orchard, sugar house/arch.	Daniel Gill built log cabin, ca. 1770, on hillside behind Gill Homestead, located on intervalle below WMA.	High Priority – Field inspection, documentation and assignment of state site number is recommended should evidence of Gill’s log cabin site be identified.
	E	Quarry	Industry and Commerce	Gill granite quarry	Quarry, waste piles, openings, access roads and related features.	Daniel Gill, ca. 1771, began to quarry on his land for mill site on Black River. Project abandoned.	High Priority – Location unknown. Field inspection and documentation recommendation.
	E	Caves	Culture and Government	Unidentified caves	Hearths, dumps and secondary constructions associated with cave habitation.	Historical record alludes to caves on Skitchewaug Mountain utilized by Tories and counterfeiterers, ca. 1788-1812.	High Priority – Field inspection and documentation recommended.
	E	Iron ore deposit	Industry and Commerce	Iron ore mining	Opening(s), waste pile(s)	1869 Beers map indicates the presence of a potential iron ore deposit in or near northern portions of the WMA, although there is little reason to suspect the deposit was commercially developed.	Moderate Priority – Field inspection and documentation recommended.
	E	Historic Upland farm related resources	Agriculture	Diversified and Specialty Agriculture (ca. 1800-1875), or earlier.	Potential agricultural resources include stone walls, fence lines, orchards, sugar maple groves, sugar houses/arches, farm roads, dumps, discarded machinery.	Western portions of the WMA overlook Spencer Hollow and road leading to junctions with the Crown Point and Eureka roads, the earliest settled area of Springfield.	Moderate Priority – Field inspection and documentation recommended.
	E	Logging Camp(s) and associated structures and features	Industry and Commerce	Logging and Lumbering	Logging camps (structural remains), dumps, tote and haul roads, potential cribbed landings and other constructions.	No resources have been identified on maps or in the documentary record reviewed for this study.	Moderate Priority – Field inspection and documentation recommended.

Figure 25: Little Ascutney WMA Legal Constraints and Historic Resources Map

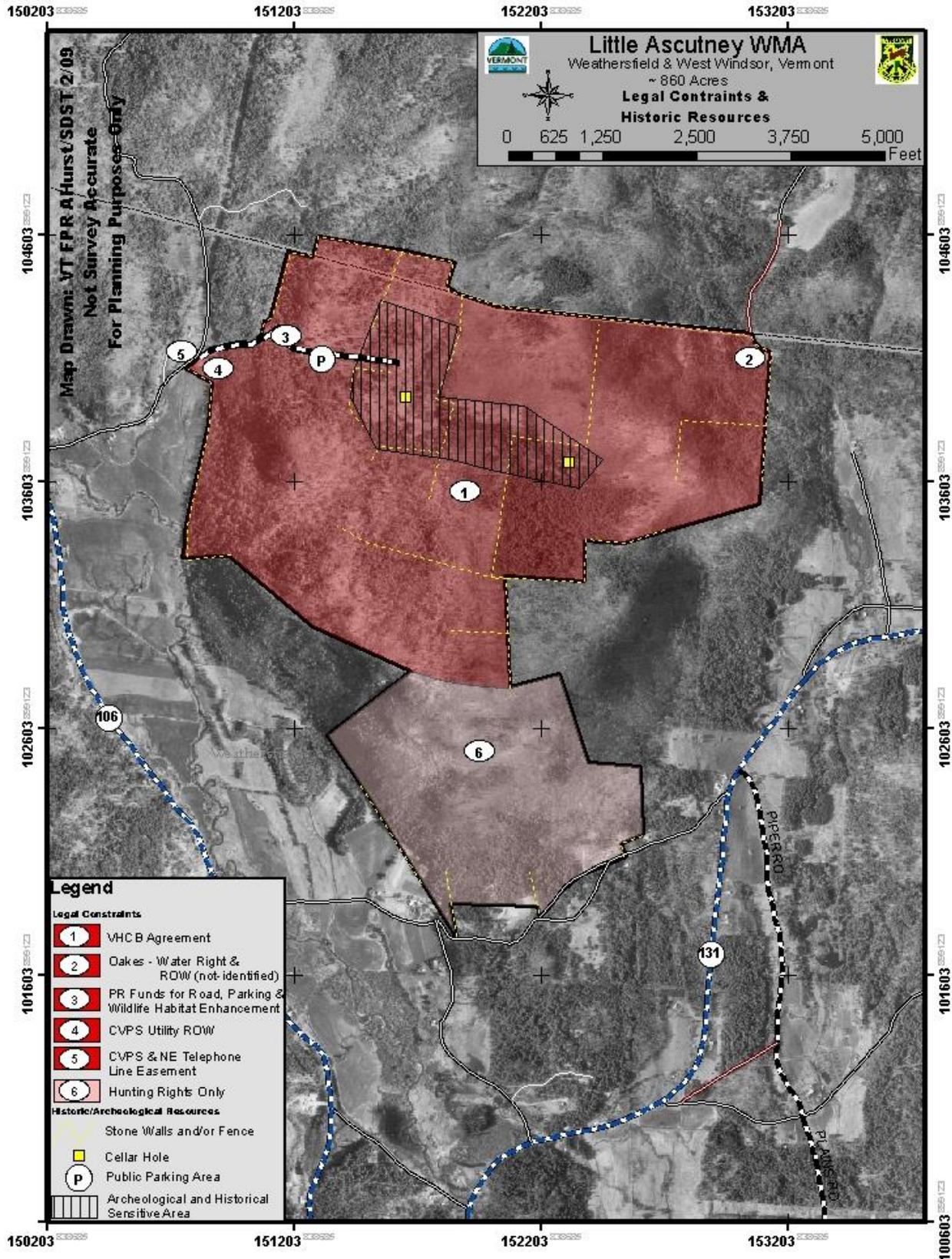


Figure 26: Mt. Ascutney State Park Legal Constraints Map

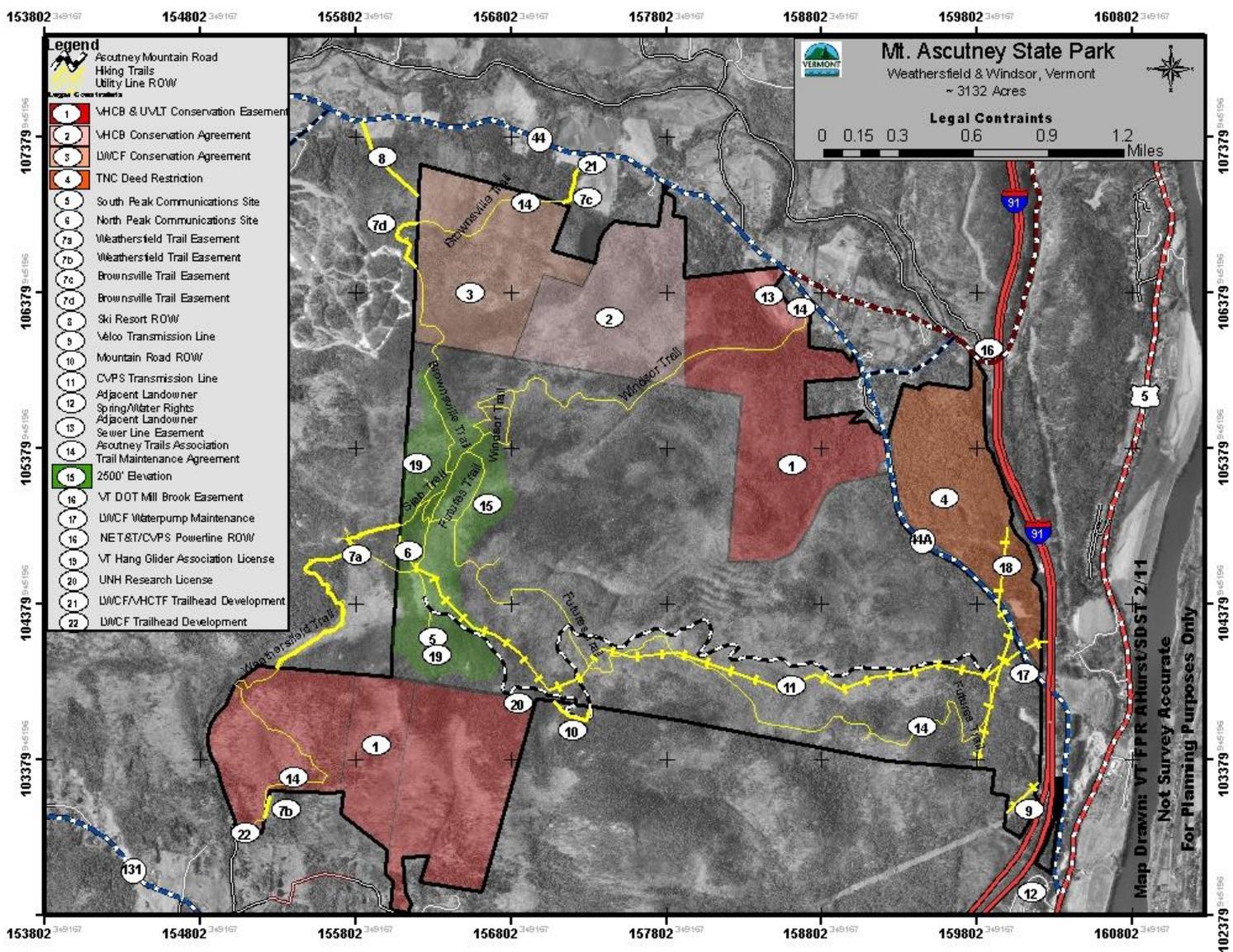


Figure 27: Mt. Ascutney State Park Historic Resources Map

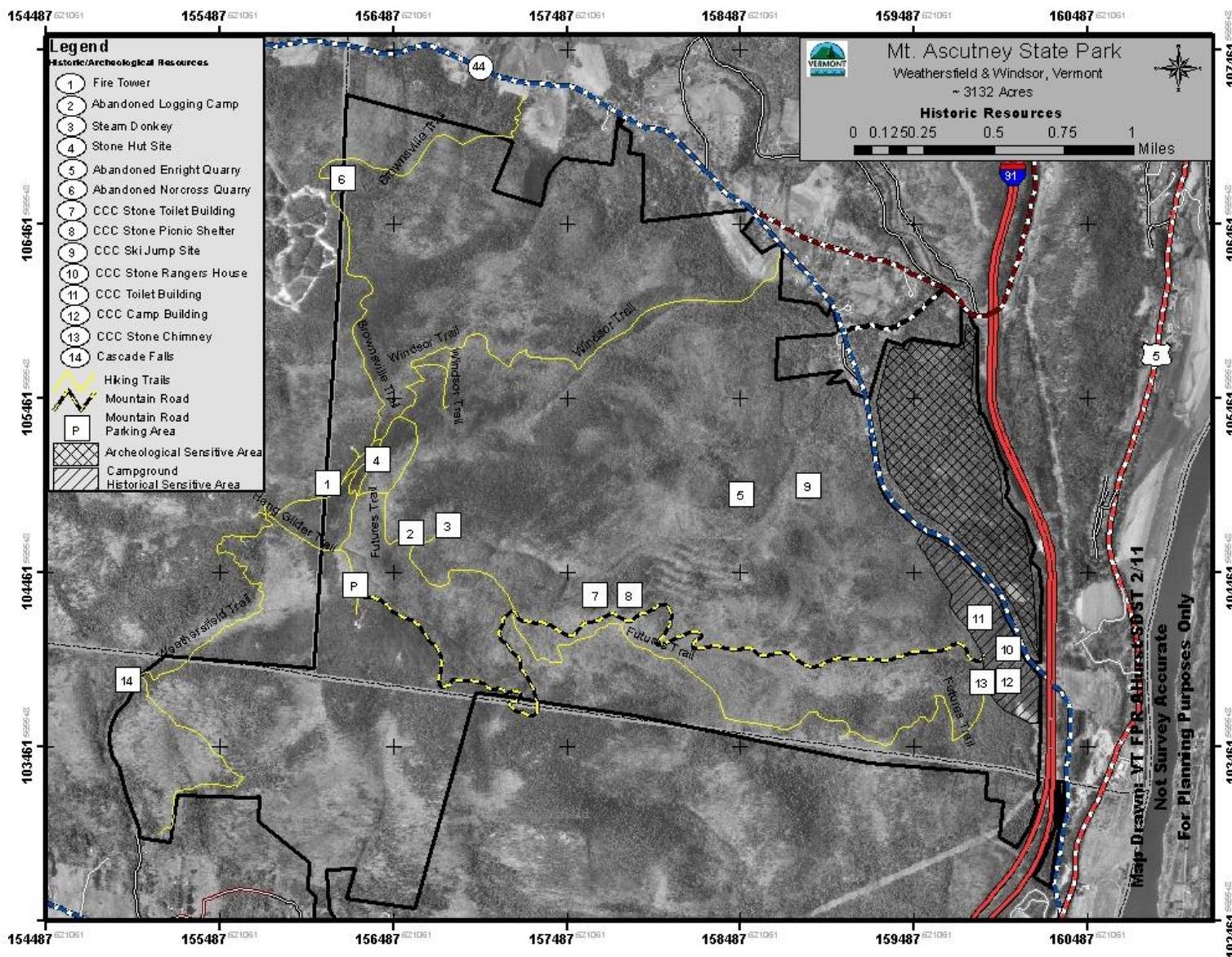


Figure 28: Skitchewaug WMA Mtn. Block Legal Constraints and Historic Resources Map

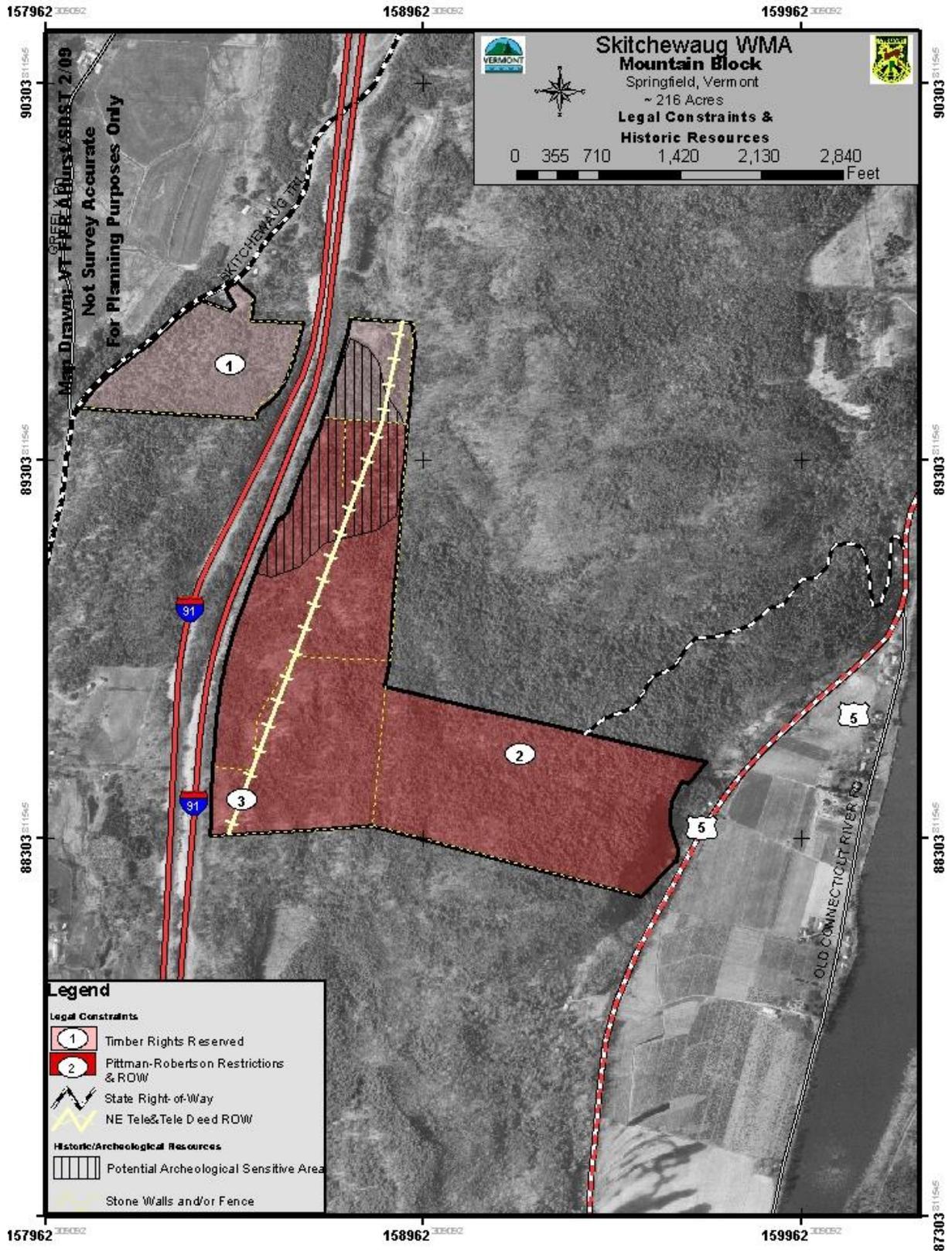


Figure 29: Weathersfield WMA Legal Constraints and Historic Resources Map

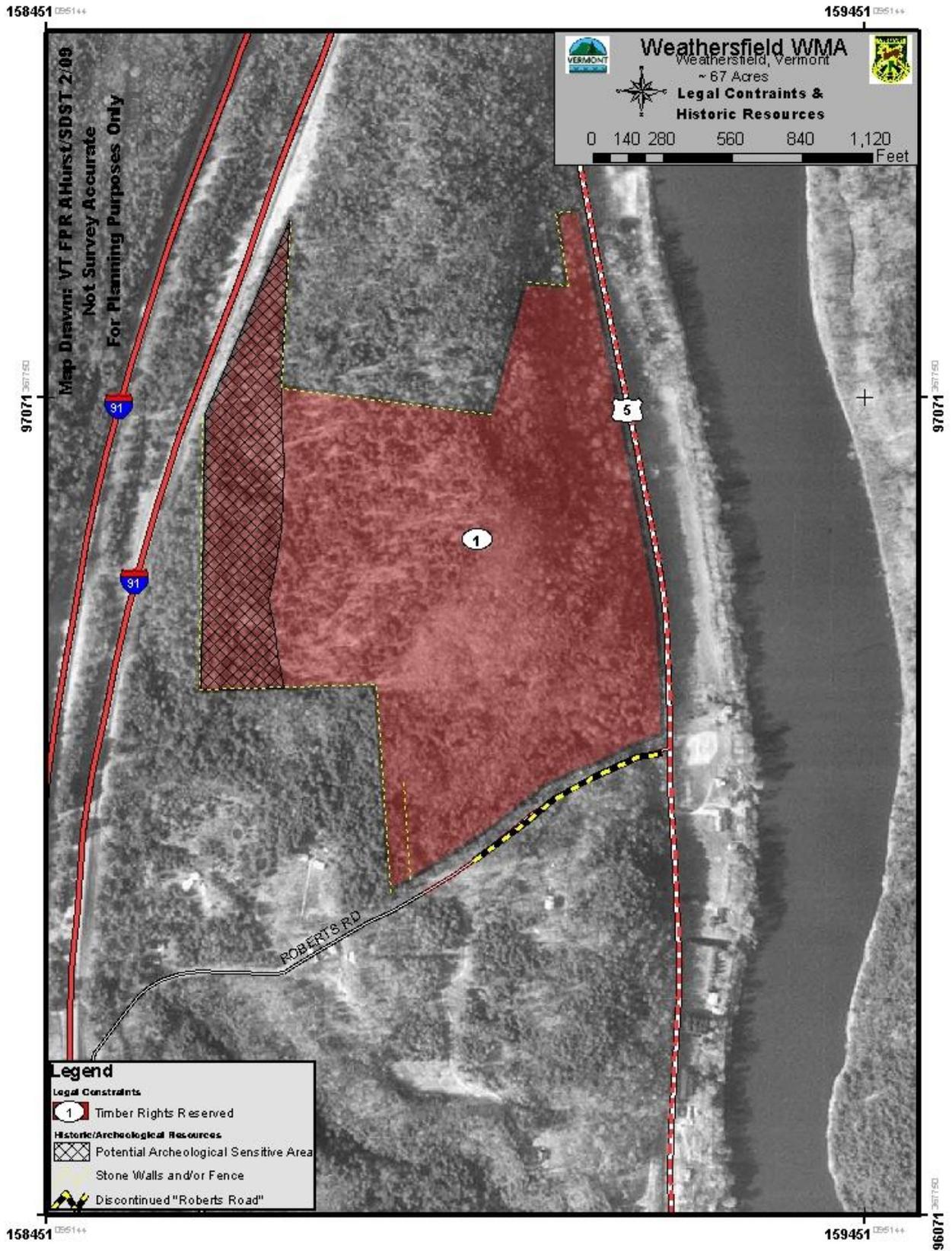
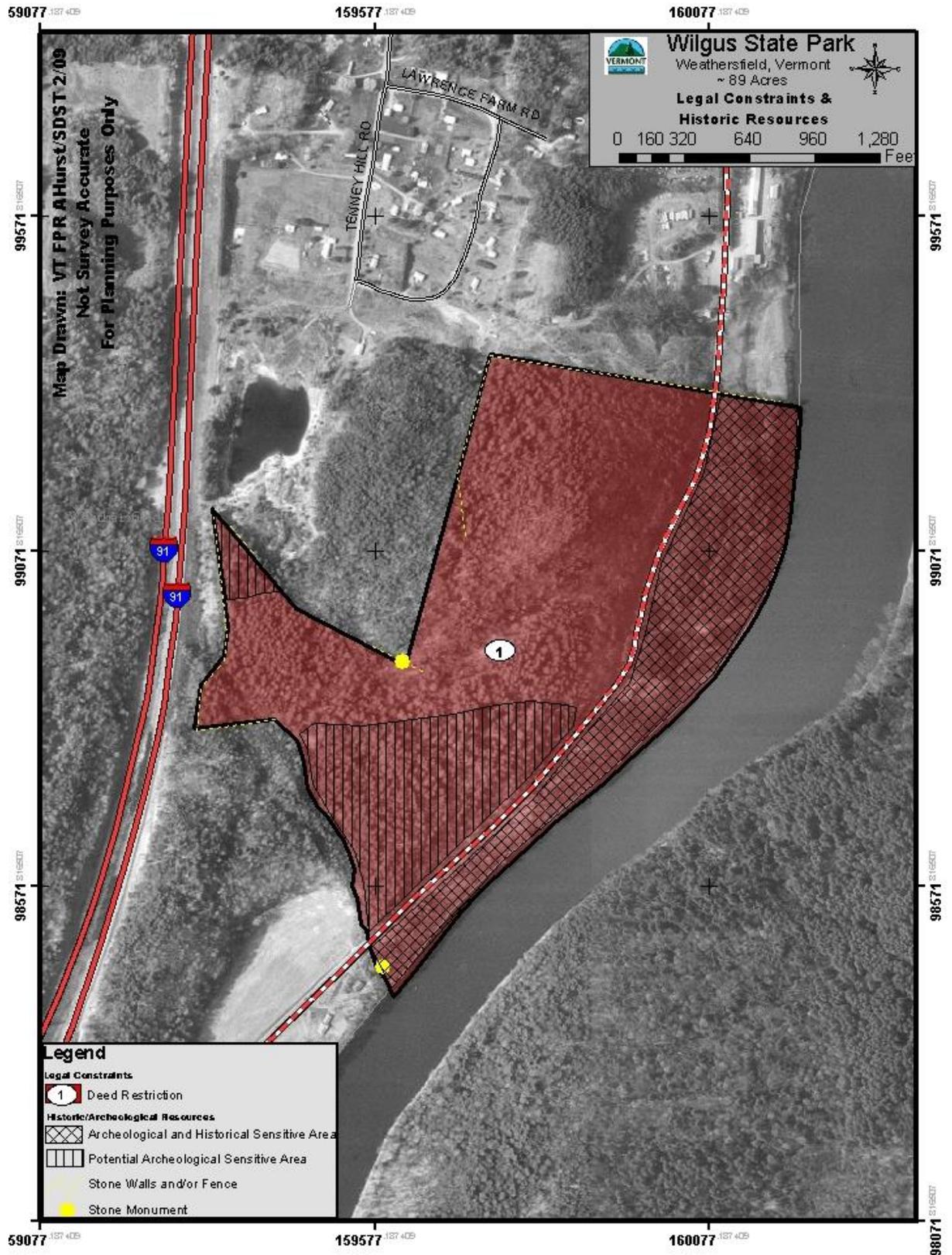


Figure 30: Wilgus State Park Legal Constraints and Historic Resources Map



## VIII. Topographic Maps

Figure 31: Little Ascutney WMA Topographical Map

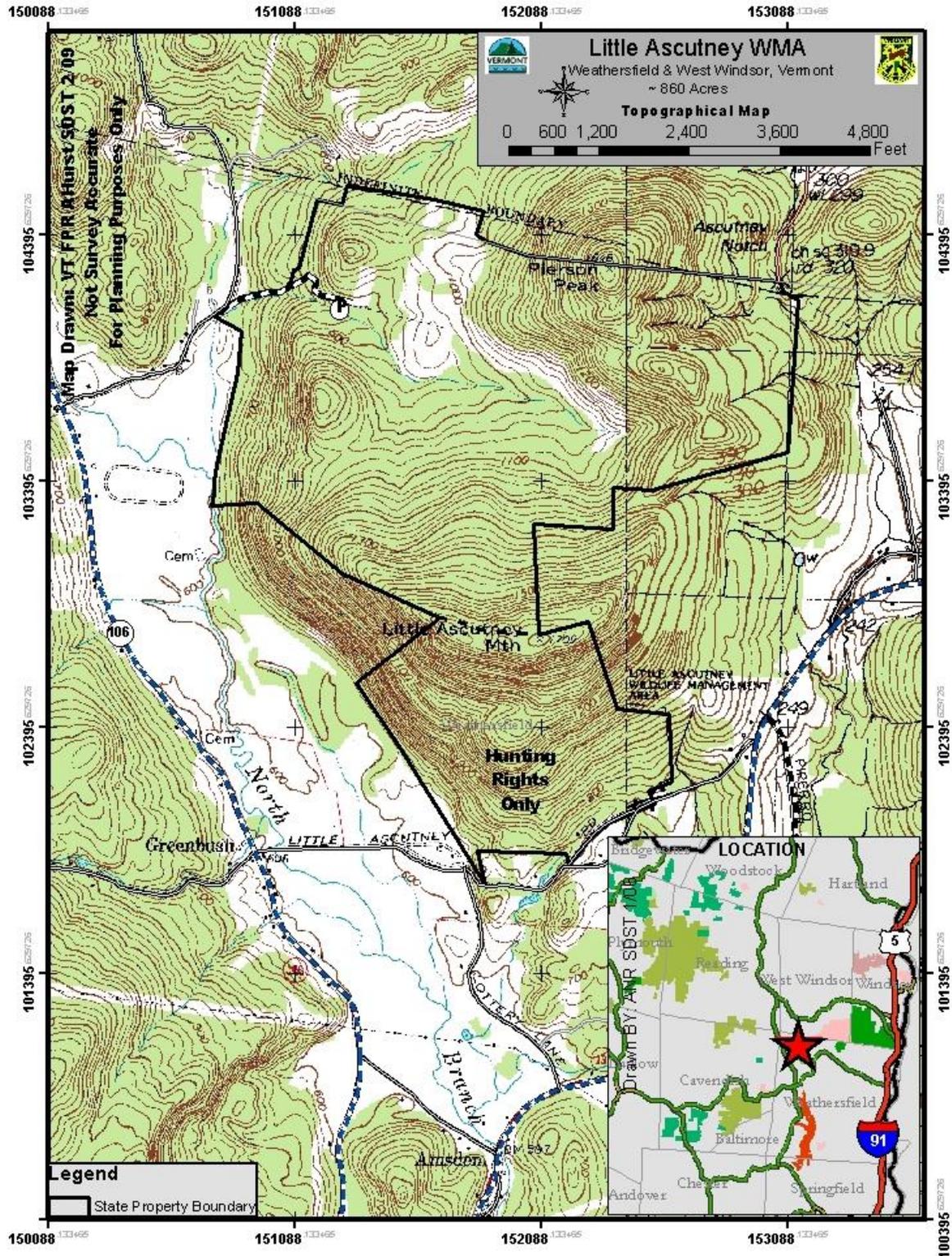


Figure 32: Mt. Ascutney State Park Topographical Map

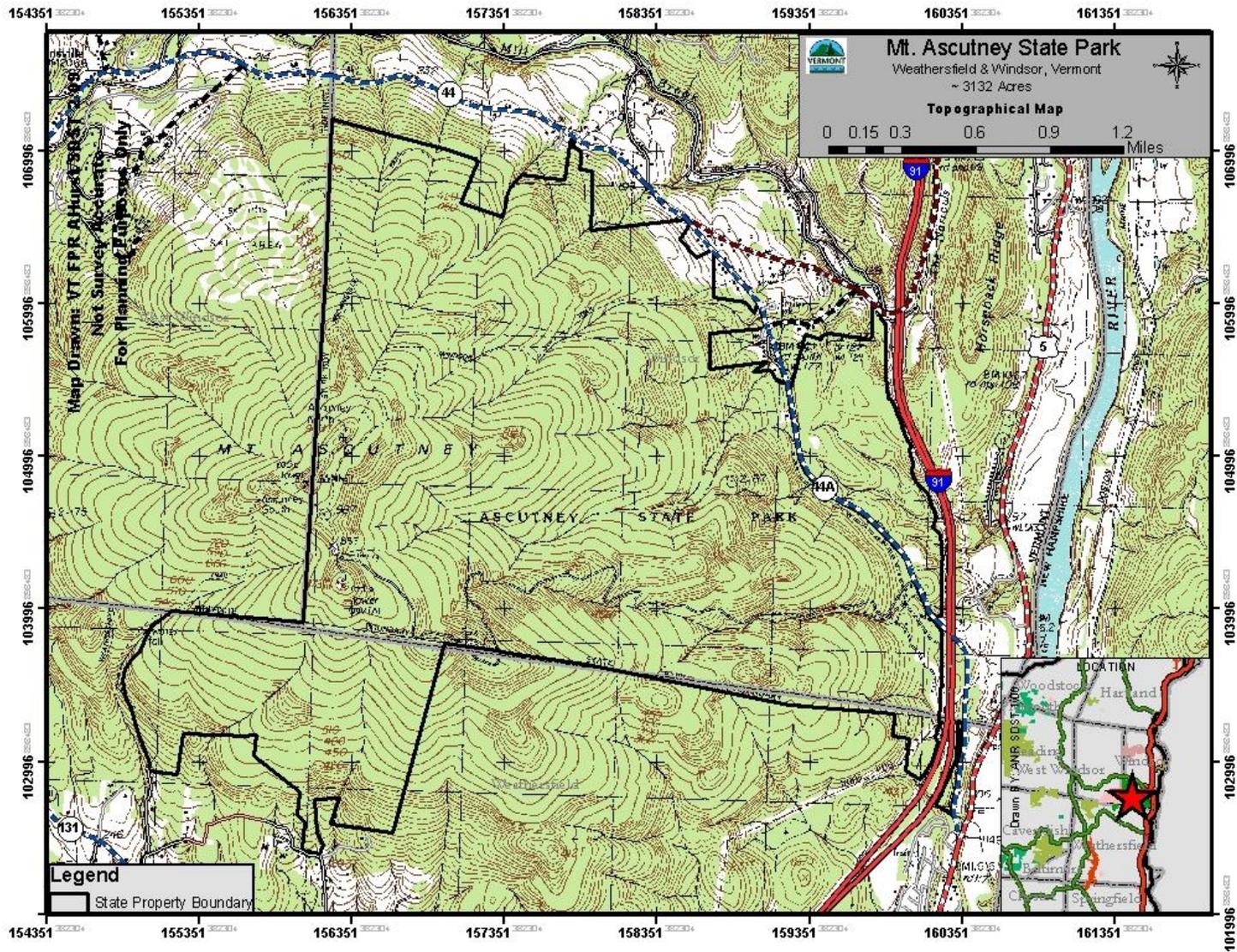


Figure 33: Skitchewaug WMA Mountain Block Topographical Map

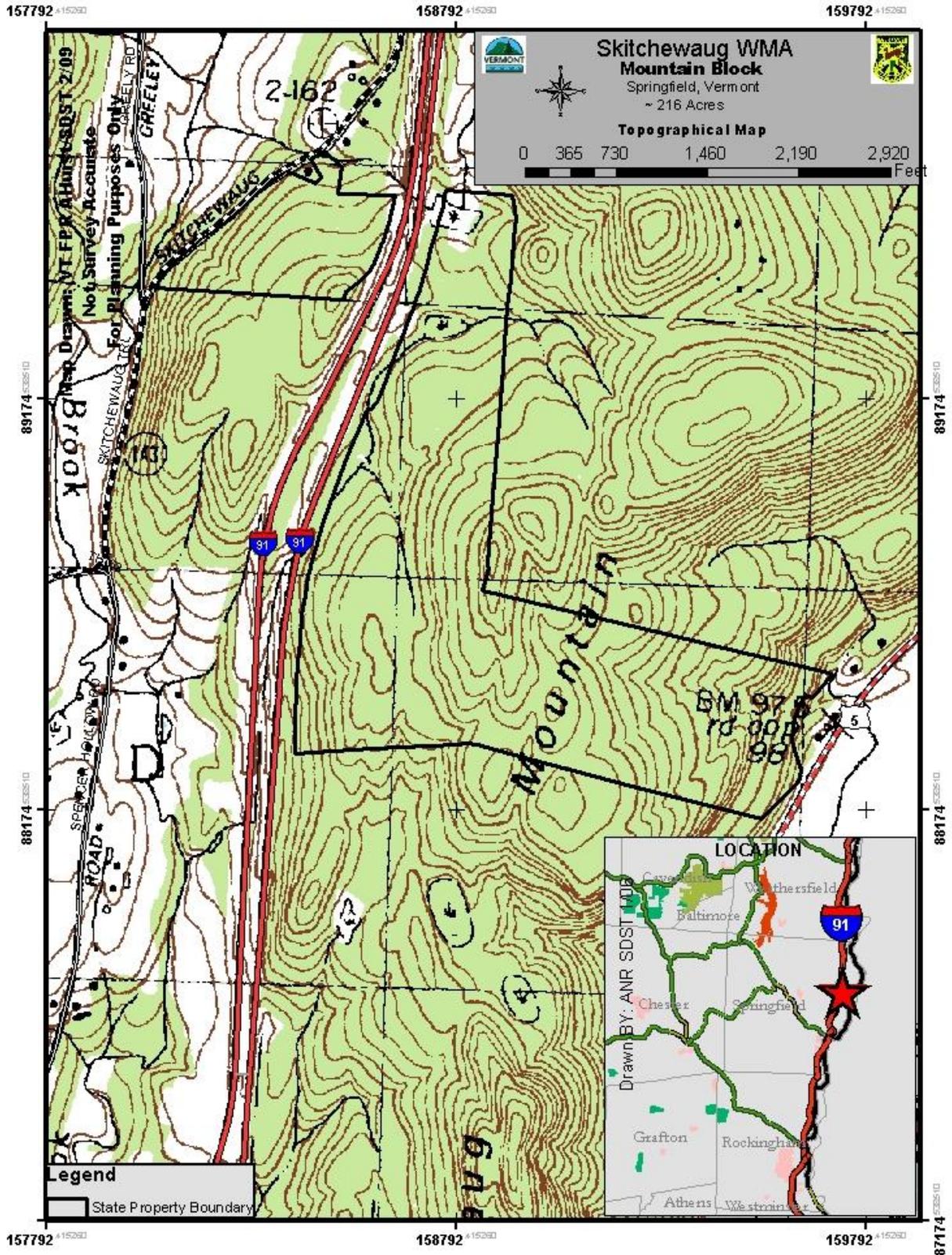


Figure 34: Skitchewaug WMA Spencer Brook Block Topographical Map

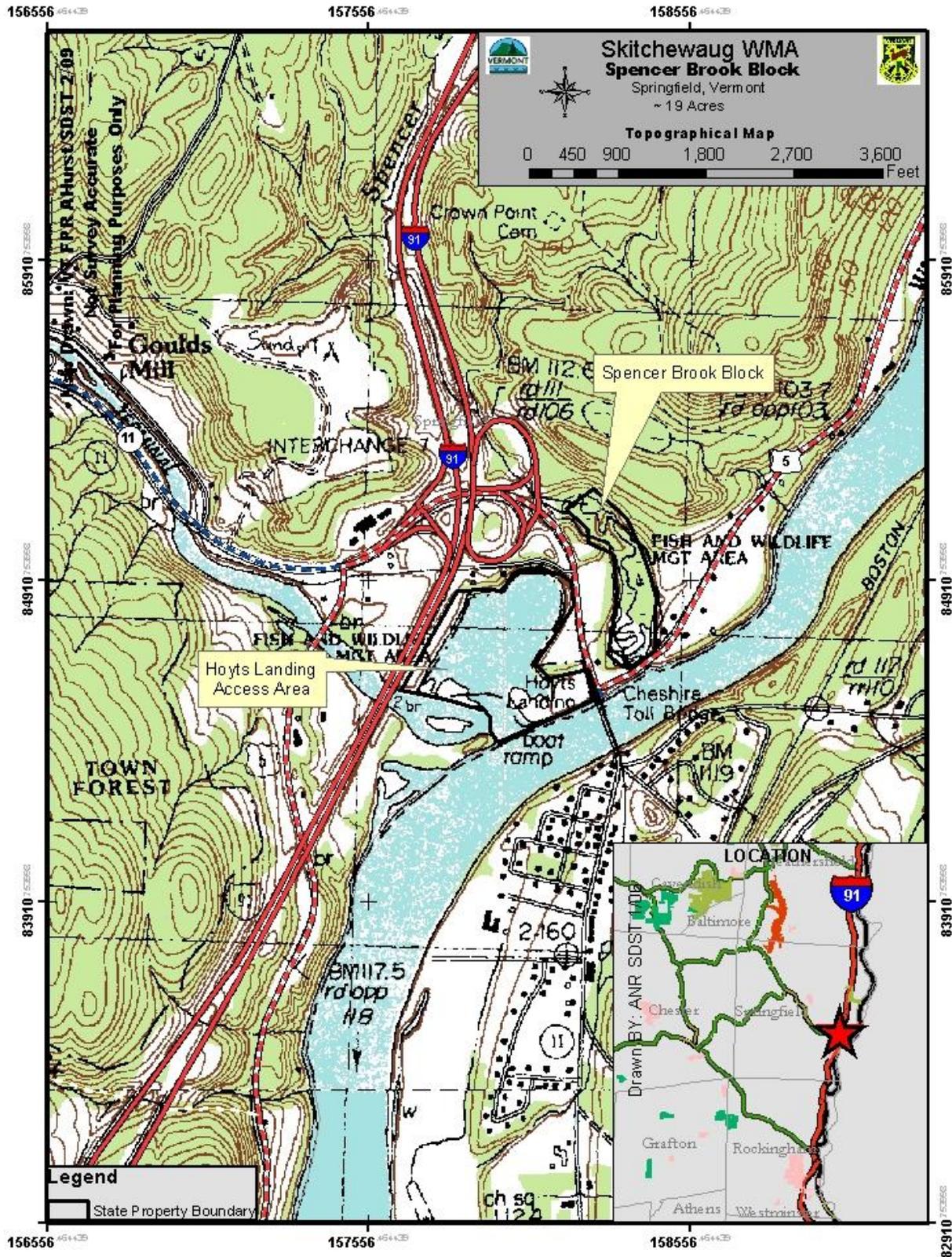


Figure 35: Weathersfield WMA Topographical Map

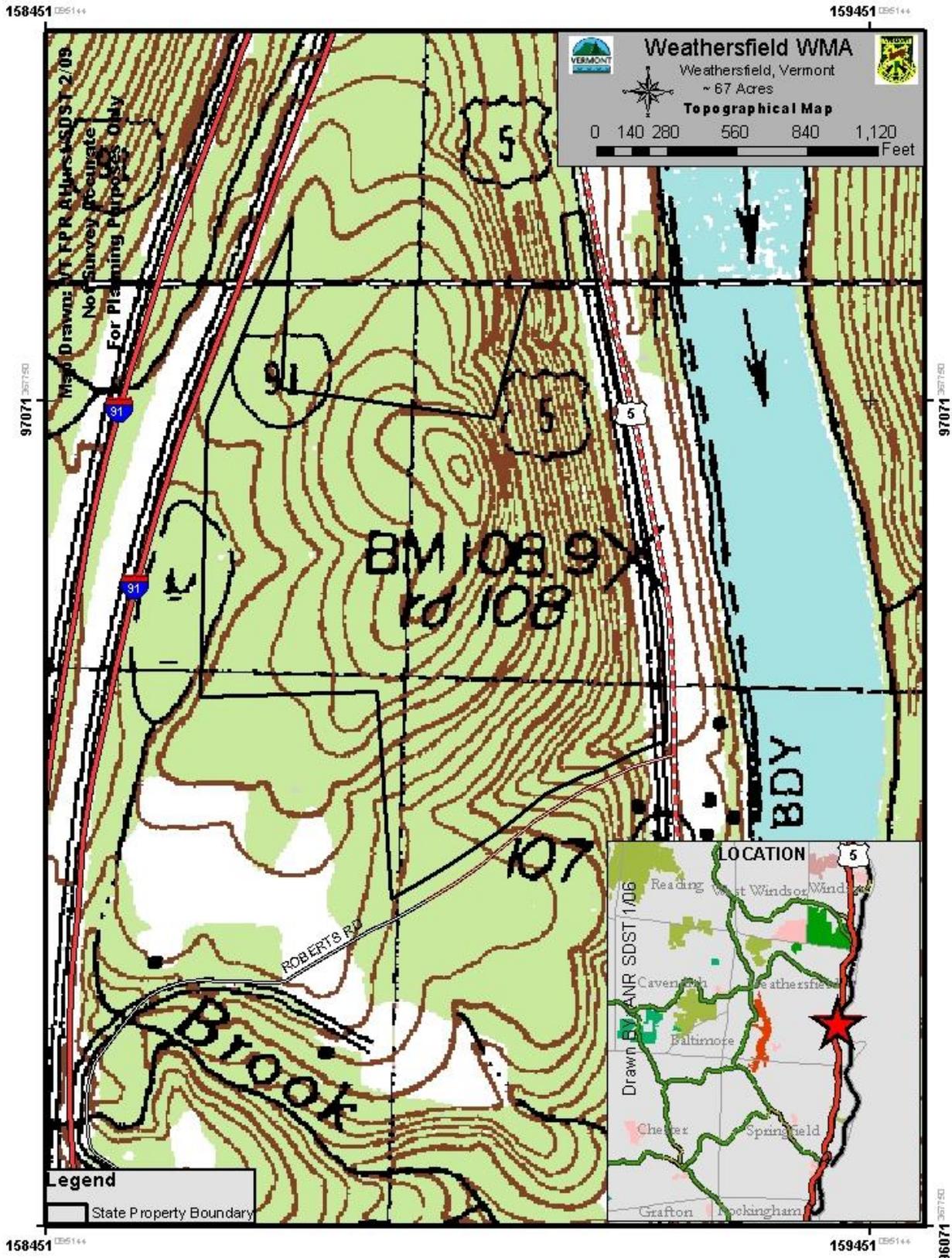
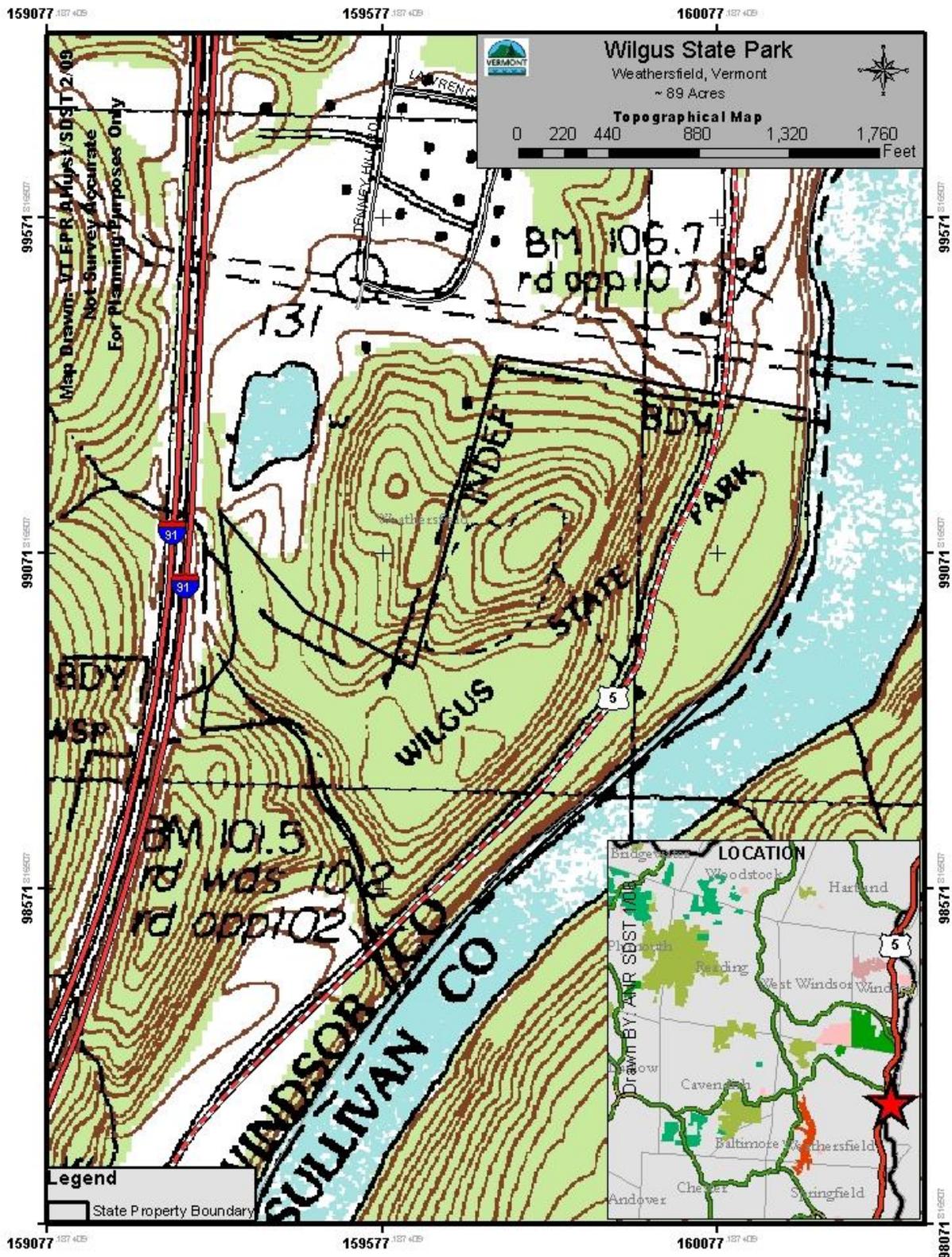


Figure 36: Wilgus State Park Topographical Map



## IX. Glossary

The following is a series of key words and their definitions used in the development of Long Range Management Plans for Vermont Agency of Natural Resource lands.

**Acceptable management practices (AMPs).** In this plan, a series of erosion control measures for timber harvesting operations, as identified in state statutes. The AMPs are the proper method for the control and dispersal of water collecting on logging roads, skid trails, and log landings to minimize erosion and reduce sediment and temperature changes in streams.

**All-aged (Uneven-aged) system.** Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

**Basal area.** A measure of the density of trees on an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5') expressed in square feet per acre.

**Best management practices.** A practice or combination of practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

**Biodiversity.** The variety of plants and animals, their genetic variability, their interrelationships, and the biological and physical systems, communities, and landscapes in which they exist.

**Biophysical region.** A region with shared characteristics of climate, geology, soils, and natural vegetation. There are currently eight biophysical regions recognized in Vermont.

**Block.** A land management planning unit.

**Browse.** The part of leaf and twig growth of shrubs, vines, and trees available for animal consumption.

**Buffer (Riparian Buffer Zone).** The width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian buffer zones are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian corridor ecosystem from the impact of these land uses.

**Canopy.** The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

**Capability.** The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils, and geology as well as the application of management practices such as silvicultural protection from fire, insects, and disease.

**Cleaning (Weeding).** Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

**Clearcutting.** A cut which removes all trees from a designated area at one time, for the purpose of creating a new, even-aged stand.

**Commercial forest land.** Land declared suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation.

**Conservation.** The careful protection, planned management, and use of natural resources to prevent their depletion, destruction, or waste.

**Conservation easement.** Acquisition of some rights on a parcel of land designed to keep the property undeveloped in perpetuity.

**Cover.** Vegetation which provides concealment and protection to wild animals.

**Cultural operation.** The manipulation of vegetation to control stand composition or structure, such as site improvement, forest tree improvement, increased regeneration, increased growth, or measures to control insects or disease. Examples of methods used are timber stand improvement, cleaning or weeding, release, and site preparation.

**DBH (diameter at breast height).** The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

**Deer wintering area.** Forest area with at least 70 percent conifer that provides suitable, stable habitat to meet deer needs during the winter.

**Den tree.** A live tree at least 15 inches DBH (diameter at breast height) containing a natural cavity used by wildlife for nesting, brood rearing, hibernating, daily or seasonal shelter, and escape from predators.

**Developed (or intensive) recreation.** Activities associated with man-made structures and facilities that result in concentrated use of an area. Examples are campgrounds and ski areas.

**Diameter at breast height (DBH).** The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

**Dispersed recreation.** Outdoor recreation activities requiring few, if any, support facilities.

**Ecological processes.** The relationships between living organisms and their environment. Among these processes are natural disturbances such as periodic fire, flooding, or beaver activity; natural stresses such as disease or insects; catastrophic weather-related events such as severe storms or lightning strikes; or more subtle ongoing processes such as succession, hydrology, and nutrient cycling.

**Ecological reserve.** An area of land managed primarily for long-term conservation of biodiversity.

**Ecosystem.** A complex array of organisms, their natural environment, the interactions between them, the home of all living things, including humans, and the ecological processes that sustain the system.

**Ecosystem management.** The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity, uses, products, and services over the long-term.

**Endangered species.** A species listed on the current state or Federal endangered species list (VSA Title 10, chapter 123). Endangered species are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

**Even-aged system.** Timber management that produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, seed tree (seed cut) method, and shelterwood method.

**Forest health.** Condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity.

**Forest type.** A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined and named after the one or more dominant species of trees, such as the spruce-fir and the birch-beech-maple types.

**Forestry.** The art and science of growing and managing forests and forest lands for the continuing use of their resources.

**Fragmentation.** Division of a large forested area into smaller patches separated by areas converted to a different land use.

**Game species.** Animals habitually hunted for food, particular products, sport, or trophies.

**Geographic Information Systems.** A computer-based means of mapping lands and resources and communicating values associated with them (GIS).

**Green certification.** A process, sponsored by several international organizations, that promotes sustainable forest management practices, providing a marketplace identify for forest products certified to have been grown and manufactured in a sustainable manner.

**Group Selection.** The removal of small groups of trees to meet a predetermined goal of size, distribution, and species.

**Habitat.** A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

**Hardwood.** A broad leaved, flowering tree, as distinguished from a conifer. Trees belonging to the botanical group of angiospermae.

**Healthy ecosystem.** An ecosystem in which structure and functions allow the maintenance of the desired conditions of biological diversity, biotic integrity, and ecological processes over time.

**Heritage Sites.** Sites identified by the Vermont Nongame and Natural Heritage Program of the Department of Fish and Wildlife, which have rare, threatened, or endangered species of plants or animals. Heritage sites are identified using a common standards-based methodology, which provides a scientific and universally applicable set of procedures for identifying, inventorying, and mapping these species.

**Intensive (or developed) recreation.** Outdoor recreation activities requiring major structures and facilities.

**Interior dependent species.** Those wildlife species that depend on large unbroken tracts of forest land for breeding and long term survival. The term is also often used in conjunction with neotropical migratory bird species requiring large patches of fairly homogeneous habitat for population viability.

**Intermediate treatment.** Any treatment or tending designed to enhance growth, quality vigor, and composition of the stand after its establishment or regeneration and prior to the final harvest.

**Land conservation.** The acquisition or protection through easements of land for wildlife habitat, developed state parks, and working forests.

**Landscape.** A heterogeneous area of land containing groups of natural communities and clusters of interacting ecosystems. These can be of widely varying scales but normally include a range of elevations, bedrock, and soils.

**Mast.** The fruit (including nuts) of such plants as oaks, beech, hickories, dogwood, blueberry, and grape, used for food by certain wildlife species.

**Motorized use.** Land uses requiring or largely dependent on motor vehicles and roads.

**Multiple-use forestry.** Any practice of forestry fulfilling two or more objectives of management, more particularly in forest utilization (e.g. production of both wood products and deer browse).

**Multiple-use management.** An onsite management strategy that encourages a complementary mix of several uses on a parcel of land or water within a larger geographic area.

**Native (species).** A plant or animal indigenous to a particular locality.

**Natural Area.** Limited areas of land, designated by Vermont statute, which have retained their wilderness character, although not necessarily completely natural and undisturbed, or have rare or vanishing species of plant or animal life or similar features of interest which are worthy of preservation for the use of present and future residents of the state. They may include unique ecological, geological, scenic, and contemplative recreational areas on state lands.

**Natural community.** An assemblage of plants and animals that is found recurring across the landscape under similar environmental conditions, where natural processes, rather than human disturbances, prevail.

**Nongame species.** Animal species that are not hunted, fished, or trapped in this state. This classification is determined by the state legislature.

**Northern hardwood.** Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, white birch, black cherry, red spruce, and hemlock.

**Old growth forest.** A forest stand in which natural processes and succession have occurred over a long period of time relatively undisturbed by human intervention.

**Outdoor recreation.** Leisure time activities that occur outdoors or utilize an outdoor area or facility.

**Overstory.** That portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer.

**Pole.** A tree of a size between a sapling and a mature tree.

**Pole timber.** As used in timber survey, a size class definition; trees 5.0 to 8.9 inches (varies by species) at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

**Regeneration treatment (harvest cut).** Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.

The four basic methods used to regenerate a forest are clearcutting, seed-tree, shelterwood, and selection (group selection or single tree selection).

**Regeneration methods.** Timber management practices employed to either regenerate a new stand (regeneration cutting) or to improve the composition and increase the growth of the existing forest (intermediate treatment).

**Regulated Hunting/Fishing/Trapping.** The harvest of wildlife under regulations stipulating setting of seasons, time frame of lawful harvest, open and closed zones, methods of take, bag limits, possession limits, and reporting or tagging of species.

**Release (release operation).** The freeing of well-established cover trees, usually large seedlings or saplings, from closely surrounding growth.

**Removal cut.** The final cut of the shelterwood system that removes the remaining mature trees, completely releasing the young stand. An even-aged stand results.

**Salvage Cutting.** The removal of dead, dying, and damaged trees after a natural disaster such as fire, insect or disease attack, or wind or ice storm to utilize the wood before it rots.

**Sanitation cutting.** The removal of dead, damaged, or susceptible trees to improve stand health by stopping or reducing the spread of insects or disease.

**Sapling.** As used in timber surveys, a size class definition. A usually young tree larger than seedling but smaller than pole, often 1.0 to 4.9 inches at DBH.

**Seedling.** A very young plant that grew from a seed.

**Seed-Tree (Seed Cut) method.** The removal of most of the trees in one cut, leaving a few scattered trees of desired species to serve as a seed source to reforest the area.

**Shelterwood method.** A series of two or three cuttings which open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

**Silvicultural systems.** A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

**Single tree selection method.** Individual trees of all size classes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration.

**Site Preparation.** Hand or mechanical manipulation of a site, designed to enhance the success of regeneration.

**Snag.** Includes standing dead or partially dead trees that are at least 6 inches in diameter at breast height (DBH) and 20' tall.

**Softwood.** A coniferous tree. Softwood trees belong to the botanical group gymnospermae, including balsam fir, red spruce, and hemlock.

**Stand improvement.** An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven-aged stands.

**State Distribution Rank.** Value that best characterizes the relative rarity (abundance) or endangerment of a native taxon within Vermont's geographic boundary or throughout its range, respectively. Ranks are as follows:

1 – Very rare (Critically imperiled): At very high risk of extinction or extirpation due to extreme rarity (often 5 or fewer populations or occurrences), very steep declines, or other factors

2 – Rare (Imperiled): At high risk of extinction or extirpation due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors

3 – Uncommon (Vulnerable): At moderate risk of extinction or extirpation due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors

4 – Common to uncommon (Apparently secure): Locally common or widely scattered to uncommon, but not rare; some cause for long-term concern due to declines or other factors; or stable over many decades and not threatened but of restricted distribution or other factors

5 – Common (Secure): Widespread and abundant

**State Legal Status.** Legal protection under Vermont Endangered Species Law (10 V.S.A. Chap. 123).

E = Endangered: in immediate danger of becoming extirpated in the state

T = Threatened: with high possibility of becoming endangered in the near future

**Stewardship.** Caring for land and associated resources with consideration to future generations.

**Sustainability.** The production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.

**Sustained yield.** The yield that a forest can produce continuously at a given intensity of management.

**Thinning.** Removing some of the trees in a dense immature stand primarily to improve the growth rate and form of the remaining trees and enhance forest health.

**Threatened species.** A species listed on the state or Federal threatened species list. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

**Timber lands.** Properties that are managed primarily for the maximum production of forest products.

**Timber Stand Improvement.** Activities conducted in young stands of timber to improve growth rate and form of the remaining trees.

**Traditional uses.** Those uses of the forest that have characterized the general area in the recent past and present, including an integrated mix of timber and forest products harvesting, outdoor recreation, and recreation camps or residences.

**Uneven-aged (All-aged) system.** Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

**Watershed.** The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

**Weeding (cleaning).** Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

**Wilderness.** Areas having pristine and natural characteristics, typically roadless and often with some limits on uses. (This is not the federal definition of wilderness.)

**Wildlife habitat.** Lands supplying a critical habitat need for any species of wildlife, especially that which requires specific treatment and is of limited acreage.

**Working forest.** Land primarily used for forestry purposes but also available for recreation, usually where both managed land and land not presently being managed is present.

**Working landscape.** A landscape dominated by land used for agricultural and/or forestry purposes.